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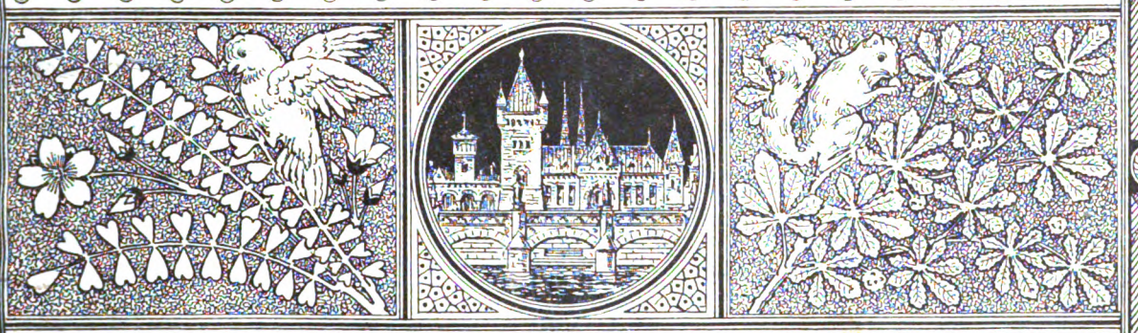
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THE City Architect of Boston presents his last annual report, the office having been abolished at the end of the last month. It is hardly necessary to say that the Report casts great credit on the administration of Mr. Wheelwright, a credit which may be more freely given to him, as his work in connection with the office has terminated. Instead of costing much more than the same services would have cost if rendered by private architects, Mr. Wheelwright shows, with pardonable satisfaction, that the architectural work on the city's buildings has been done, during his administration, for less than half the usual architect's percentage on the cost of the constructions; and the cost of the buildings themselves, which, in the earlier days of the office, used to be nearly twice as great as the cost of similar buildings in other cities, has been, as Mr. Wheelwright shows, reduced about to the normal standard. Meanwhile, the structures designed by Mr. Wheelwright for the city have continued the tradition of simplicity and refinement which have distinguished his administration of the office. He says in his report that "the purely utilitarian buildings are shown to be no cheaper than those with some pretence to architectural treatment"; and, again, "The larger the building, the greater the importance of some expenditure for beauty's sake, as compensation for the occupation of light and air by the buildings; and I have felt fully justified in the expenditures which I have made for artistic reasons"; but he does not mention, what we can say in his praise, that expenditure alone does not secure beauty, and that it is due to Mr. Wheelwright's own skill, more than anything else, that the City of Boston has been, during his term of office, supplied with a remarkably attractive collection of public buildings, which have needed very little besides brick and mortar used with the taste and discretion that only an accomplished architect could apply to them, to become, however modest their purpose, permanent adornments of the city. While, taking our views on the subject from the past history of the office, rather than from such an exceptional administration as that of Mr. Wheelwright, we believe that official municipal architecture is a mistake, and that the city, on the whole, will be better served by several of its architects than by one. We shall still regret the termination of the series of Annual Reports which have been made so interesting by Mr. Wheelwright's clear and business-like statements, and by the illustrations with which they have been ornamented, counting particularly, among the latter, the charming sketches by Mr. Maginnis, which have for years been noted in the profession.

IN Massachusetts, a good deal has already been done to carry out the suggestion made two or three years ago, by the Public School Art League, that it would be well to have the rooms of public school-houses adorned with works of art. The propriety of having the rooms in which children spend their days, in the most impressible part of their life, furnished with the works to which all civilized people attribute elevating and refining influence, is so obvious that the idea which, we believe, was originally proposed by Mr. Ruskin, has become popular, and it has become fashionable for the graduating classes of the higher schools to subscribe to leave behind them some memorial of themselves in the shape of a cast or picture. Among the Boston schools, the Girls' High School has received in this way a reduced copy of the Victory of Samothrace; the Girls' Latin School has been presented with copies of some of Luca della Robbia's reliefs; the Boys' Latin School has a cast of the Venus of Milo; the English High School has one of the Discobolus; and many similar works have been placed in other schools in the State. The Victory of Samothrace appears to be the most popular original, three or four casts of it having been given to various schools; and the Della Robbia reliefs, which have been very well reproduced in Massachusetts, are also sought after. In other places, also, the fashion has been taken up, and the public schools of Chicago have been furnished with a large number of casts, including copies of the Parthenon frieze. Some of the schools have been so unfortunate as to suffer from a perverted form of the new mode, which consists in adorning them with portrait busts or pictures, in place of real works of art. Thus a school at Roxbury has been presented with a bust of Lincoln, and another with the same, with the addition of a bust of Washington; while a school in Wakefield boasts a portrait of Franklin, and two in Waltham have been furnished with busts of Dr. Holmes. While portraits of this kind are interesting, they can hardly be called beautiful, or refining in their influence, and it is to be hoped that the generosity of the donors of such objects will not be led away from its original purpose.

THE great advantages that attend the installation of almost any "modern convenience" in any kind of a building nowadays are offset by disadvantages of various kinds and degrees, but there is none that is attended by a greater variety of dangerous possibilities than is the elevator. To get stuck in the shaft between floors, which is the most trivial of the evils the elevator may cause, may at any time involve the loss of another's life or for the unfortunate prisoners their own fortunes. The open shaft, the unprotected hatch, the weak cable, the faulty casting, the safety-catch that didn't work and the door-latch that didn't clutch, all have caused loss of life where the passenger did not contribute to his own hurt, while the maimings, crushings and deaths due to contributory negligence on the part of the passenger are innumerable. But perhaps no elevators cause more disasters than those established in small apartment-houses and other buildings where the tenants are allowed to operate the car according to their own uninstructed knowledge and ideas of safety. To such an elevator, run under such conditions, we owe the death of I. Henry Paige, who for thirteen years or more was connected with the advertising business of this journal and during that long service succeeded in making in all parts of the country firm and lasting friendships with many dealers in building materials with whom he was brought in contact. Like most men of his age, he had before entering on the calling for which he was so admirably adapted followed other occupations and was only deterred from taking an active part in the Civil War through imperfection of eyesight — an imperfection that may indirectly have caused the accident — but in spite of this, he busied himself "at the front" doing what a civilian might to help the Union cause by making the soldier's lot less hard. Generous, kindly and courteous to all with whom he had to do, we and his many friends can but regret that the end overtook him in so agonizing a way.

M. E. CHEYSSON, who, although an engineer, is noted as an authority in social science, writes for *Le Génie Civil* a most interesting review of Levasseur's great work on the population of France. Most people know that the population of France, although it does not actually diminish, increases very slowly. M. Levasseur gives actual figures, which show that, in 1789, the population of France was 26,000,000. In 1800, it was a little more than this, and, in the ninety years succeeding, it has increased sixteen per cent. Meanwhile, Europe, as a whole, has far more than doubled in population. In 1800, the total population of Europe was 175,000,000. In 1890, it was 360,000,000. This figure does not

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include the 80,000,000 of emigrants who have left Europe during the century to establish themselves in other countries. Examining the different European countries separately, we find that, while France was adding sixteen per cent to her population, Austria added fifty-eight per cent; England added one hundred and thirty-six per cent; Russia, one hundred and eighty per cent; and Prussia, two hundred and forty-three per cent. Within the last twenty years, the difference in growth between France and other countries is still more striking, England and Germany increasing in population three times, and Russia five times, as fast as France; and, in 1890, the number of deaths in France actually exceeded the number of births. It is not surprising that a member of the German Parliament complacently remarked that, in comparison with the rest of Europe, "every day that passed was equivalent to the loss of a battle for France," and that "before long the enemies of France would not need to trouble themselves about her"; and the truth of this rather unfeeling observation is shown by inexorable statistics, according to which, in 1700, the population of France formed thirty-eight per cent of that of the three great powers; in 1789, it was twenty-five per cent, and it is now only thirteen per cent, counting, in place of the three great powers of the last century, the six great powers of the present day — Germany, England, Austria, France, Italy and Russia.

IN discussing the causes of this melancholy deterioration of his great country, M. Levasseur makes some very curious observations. That the trouble is not physical, as some people think, he shows by referring to the development of the French race in Canada. The French part of the Dominion was settled mainly by Normans. In France, at present, Normandy is perhaps the most sterile, in point of human products, of all the provinces, but on the other side of the Atlantic, the Norman-Canadians, who numbered 60,000 when they were ceded by Louis XV, with "a few acres of snow," to the English, now number 1,500,000, in Canada alone, and more than 500,000 more have crossed the border and settled in the United States. If the cause of the decline of population is not physical, it must be sought in moral or social conditions, and M. Levasseur finds these, as they exist in France, quite sufficient to account for it. Every one knows that at the time of the French Revolution, a law was passed, expressly to impoverish the aristocracy, providing that landed property, instead of being bequeathed to the eldest son, or entailed in any way, must, on the death of its owner, be equally divided among his children. In this provision of the Code M. Levasseur finds the sufficient cause for the sterilization of France. To have one child is, for the small proprietors who form a very large part of the French population, to leave him comfortably off; to have several children is to be compelled to leave each a tiny slice of land, not enough to live on. Of course, the extra children would probably manage to eke out a living in some other way than by cultivating beans on a half-acre field; but the prudent French do not like to take risks where the future of their beloved children is concerned; and the first child is very likely to be the only one.

AS contrasted with this artificial system of the inheritance of property, and its effects, M. Levasseur cites the case of Russia. In that country, as our readers know, the land belongs, in theory, to the community, each *mir*, or village, holding a certain territory. At intervals, a temporary distribution of the land is made, the members of the community receiving allotments in proportion to the number of males in each family; or, sometimes, the allotments are made by households. In the former case, every boy born to a family brings with him a claim to an extra slice of farming land; while, in the latter case, a young man has only to get married to become entitled to participate in the next allotment; and it is easy to see that an incentive to increase is put before the people which has had its natural effect in the rapid growth of the Russian population. In England, perhaps because the eldest son of a landed proprietor, being sure of wealth and position, could be trusted to look out for his younger brothers and sisters, the laws of entail and primogeniture have favored large families; so that, even in 1815, at the Congress which disposed of France after the Battle of Waterloo, the English representative, disappointed at not having been able to secure the contraction of the French frontier within the limits that he thought desirable, solaced himself by remarking: "After all, the French are sufficiently weakened by their law of inheritance." So far as M. Levasseur is concerned, he is convinced that the principle of the French law is wrong. The old Malthusian doctrine, that poor people must limit their families, because there is now only just food enough in the world to go around, and, if the population is increased, some one will have to go hungry, is based on the assumption that men consume more than they produce. In point of fact, the opposite is true. It is demonstrated that increase of population is accompanied by a far greater increase in food, clothing and comfort; and M. Levasseur shows that the people of Europe, notwithstanding their great increase in number, are better fed, better clothed, better housed and better paid than their fathers or their grandfathers. Undoubtedly, the same rule would apply to families as to nations, and a household permitted to increase without legal restrictions on inheritance would, as a rule, present a history of greater comfort and affluence than that of the single Norman heir of his father's little farm; but the law of succession has become so rooted in French habits that it will be difficult to make a change. Meanwhile, the Government, realizing the necessities of the case, but afraid to take any radical step, contents itself with half-way measures of rather questionable value, as, for instance, the law, now in force, which provides that every seventh child in a family shall be educated at the public expense. That such a law as this should have any appreciable effect in promoting the increase of the population is very unlikely, and such increase as it might secure would not be of the most desirable kind. It is not the increase of the proletariat population that needs to be promoted, although M. Levasseur repudiates earnestly the horrible theories of the inheritance of crime; but the multiplication of the prudent, modest and virtuous people who form the real substance of every nation, and who have for so many centuries, by their industry, intelligence and greatness of heart, kept France at the head of the civilized world; and the civilized world is interested in the problem of promoting that multiplication.

THE American explorations in Greece seem to go on with increasing energy and success. Dr. Waldstein writes that the operations at Argos are called by the Greek Director of Antiquities "the model excavation of Greece." The work here has resulted in the discovery of a great number of the "bee-hive tombs" characteristic of pre-historic Argolis, and in laying bare a splendid stoa, "one of the most imposing buildings in Greece," as Dr. Waldstein calls it. This stoa stands below the temple, a marble staircase leading from it to the platform on which the temple was built, and there are evidences that the temple fell while the stoa was still intact, as drums from the temple columns still lie on the floor of the stoa, surrounded by fragments of the roof tiles and metopes from the stoa, which they brought with them as they crashed through the lower building. Among the fragments found in and about the ruins are many portions of statues and bas-reliefs, and sculptured stones, one of these being inscribed in the earliest Argive characters.

LA REVUE INDUSTRIELLE describes a sort of portable construction which, although, as we believe, it originated in this country, has nearly gone out of use here, while it is becoming popular abroad. This construction consists simply in suitable assemblages of iron pipes and connections, and has the great advantage that the pieces are light and portable, while the work is very readily put together with the simplest tools. France is now extending so rapidly its colonial possessions that these portable barracks, warehouses, hospitals and dwellings are greatly in demand, and it seems to us that we, who can make iron pipe, and cast connections, at least as cheaply and skilfully as our friend across the Atlantic, might find such buildings useful, and the materials for them very salable. No architect needs to be told how to combine iron tubes and connections so as to make a cheap and strong roof, but in the new French structures the system is applied to the floors, which can easily be trussed to sufficient stiffness. With covering and sides, and perhaps floors, of corrugated metal, such buildings answer well for temporary purposes; and to substitute expanded metal, covered with plaster or cement, for the corrugated sheets, is to make them much more comfortable and permanent, at a small additional expense.

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JOTTINGS IN AMSTERDAM.

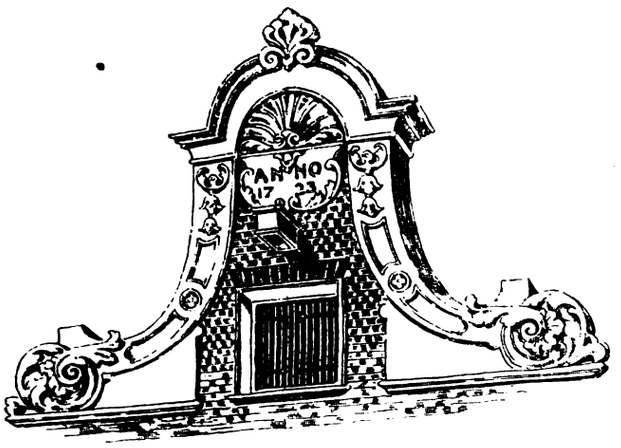


Fig. 1.

IT is many years since the venerable Syntax, tired of the monotonous and unremunerative routine of his "daily round, and common task," came to a determination which he announced to his better half in the words:

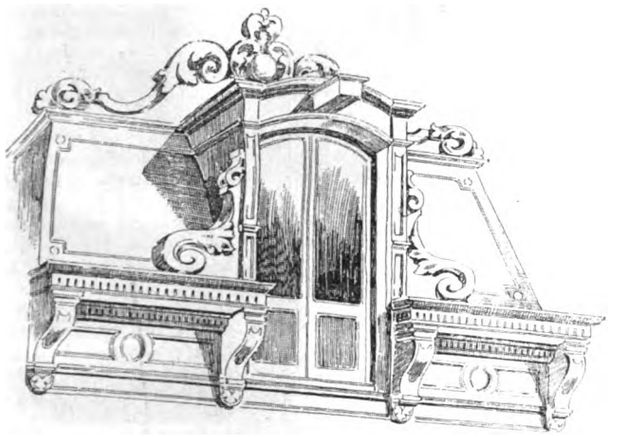


Fig. 2.

"I'll make a tour — and then I'll write it.
You know well what my pen can do,
And I'll employ my pencil, too: —
I'll ride, and write, and sketch, and print.
. . . . I'll prose it here, I'll verse it there,
And picturesque it everywhere."

and the success of his enterprise gave proof — if proof was wanting — that the picturesque possesses a never-failing charm for most



Fig. 3.

people, at least for those whose tastes are in a way cultivated. It is, indeed, a relief sometimes to get away from the rush and turmoil of modern city life to one of those Old-World spots which — as Oliver Wendell Holmes so poetically expressed it — bear "the autograph of age," and although I am not in sympathy with

"The idiot who praises in enthusiastic tone
Every century but this and every country but his own,"

it gives me intense satisfaction to ramble about, independent of any plan, in some of those old Continental cities which modern progress has not yet robbed of their quaint characteristics of bygone days. Of such, Amsterdam, whose intersecting canals and seemingly innumerable bridges have led to its being described as the "Venice of the North," ranks among those which best repay a sojourn therein, and notwithstanding the fact that I have stayed there once and again, each fresh visit only seems to increase the fascination of the place. The whole character of the city on the Amstel is so thoroughly in keeping with the spirit of the Dutch people, and everywhere one sees good old traditions perpetuated with such persistence, that the visitor might well — were he poetically inclined — exclaim, with Childe Harold,

"I can repeople with the past — and of
The present there is still for eye and thought."

It was in this humor that I recently wandered about there, with simply one idea — the same that inspired the first memorable journey of Syntax — and it may be that the jottings from my sketch-book, which appear on this and other pages, will possess a certain measure of interest to others beside myself.

In that wonderful historical novel, "*The Cloister and the Hearth*," Charles Reade says: — "The Hollanders were always an original and leading people. They claim to have invented printing (wooden type), oil-painting, liberty, banking, gardening, etc. Above all . . . they invented cleanliness." Then follows a description of an humble

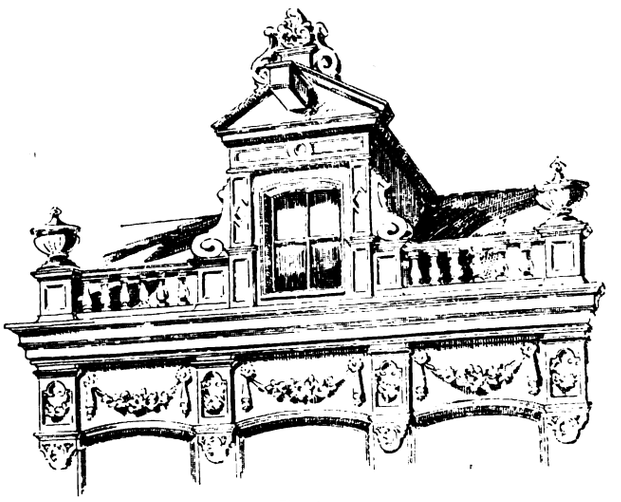


Fig. 4.

mediæval Dutch home which is well worth quoting. The novelist continues, "So, while the English gentry, in velvet jerkins and

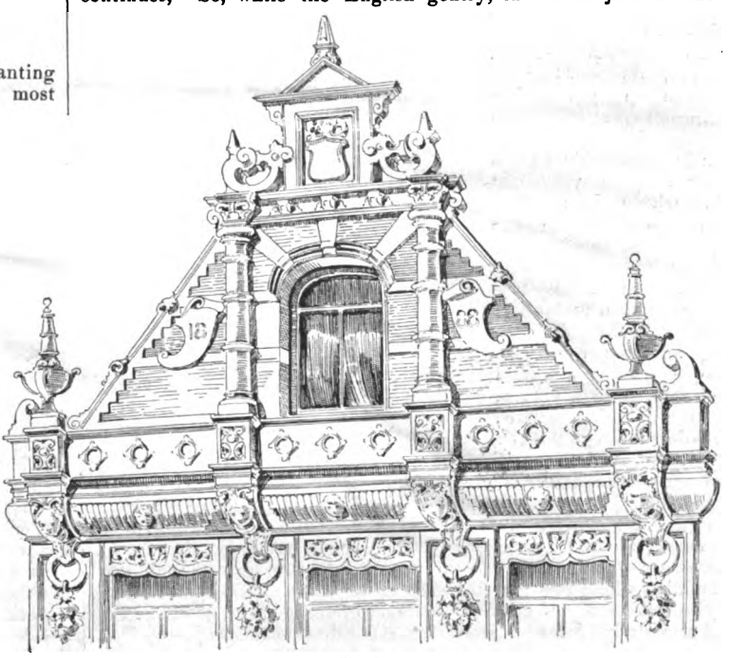


Fig. 5.

chicken-toed shoes, trode floors of stale rushes, foul receptacles of bones, decomposing morsels, spittle, dogs, eggs and all abominations, this hosier's sitting-room, at Tergou, was floored with Dutch tiles, so highly glazed and constantly washed, that you could eat off them. There was one large window: the cross stonework in the centre of

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it was very massive, and stood in relief, looking like an actual cross to the inmates, and was eyed as such in their devotions. The panes were very small and lozenge-shaped, and soldered to one another with strips of lead; the like you may see to this day in our rural cottages. The chairs were rude and primitive, all but the arm-chair, whose back, at right-angles with its seat, was so high that the sitter's head stopped two feet short of the top. This chair was of oak and carved at the summit. There was a copper pail that went in at the waist, holding holy water, and a little hand-besom to sprinkle it far and wide; and a long, narrow, but massive oak table.

But I must not be tempted into a dissertation on Dutch domestic furnishing, interesting as the subject is, as it is solely with the exterior architectural features of Amsterdam that the accompanying sketches have to do. It is not necessary for me to point out to readers of the *American Architect*, that the high-pitched gable is a principal feature in the architecture of the Netherlands, for that fact will have impressed itself upon them in their elementary professional studies. But only those who have visited the Low Countries can in any way appreciate the picturesque value with which they endow the thoroughfares wherein they are to be found in ever-changing variety. Ruskin, in a lecture delivered many years ago, said: — "The best and most natural form of the roof in the north is that which will render it most visible, namely, the steep gable: the best and most natural, I say, because this form not only throws off snow and rain most completely, and dries fastest, but obtains the greatest interior space within walls of a given height, removes the heat of the sun most effectually from the upper rooms, and affords most space for ventilation," and one might go far before they found so charming a demonstration of the principle thus enunciated as is presented by the canals of Amsterdam. There, the sky-line is broken up by countless different creations, which give a play of light and shade impossible to describe. The very fact that within the space of but a few steps one comes upon houses varying from twenty to forty or fifty feet in height, some toppling forward and others leaning backwards, casting all manner of grotesque shadows, and reflected, as in a mirror, in the winding canals, satisfies the eye with a variety for which one looks in vain in the up-to-date and severely uniform thoroughfares of cities of modern creation. I have roughly delineated just five characteristic gables belonging to different periods, and many a score of such might be reproduced without repeating the same form twice. Mr. Ruskin has, again and again, laid stress upon the fact that the impression made upon the mind by a building whose roof is well visible is far more satisfying, and conveys a fuller sense of comfort, than one where it has to be imagined, and the study of Dutch architecture certainly seems to justify that contention.

It is very curious to note how the phlegmatic nature of the Hollanders reveals itself in their rendering of the Renaissance as exemplified in such examples as these, for while to a certain degree sprightly and piquant, they are, at the same time, characterized by a restraint and solidity which are inseparable from the nature of their originators. It will be noticed that the influence of the French rococo is not absent, but it is kept well within bounds.

As far as their buildings go, the Dutch certainly cannot be accused, to any great extent, of inconsistency, for even in their most modern erections the traditional lines of the country are followed with marked fidelity. In one or two cases exception to this rule is to be noted, but, generally speaking, the Dutch Renaissance continues to hold almost undisputed sway. As I have said, there are exceptions, and one of these is a delightful study in the François Premier style, in the Heerengracht, Amsterdam, which it is safe to say is one of the most decorative buildings designed of late years. Just two portions of this are roughly indicated herewith, but it is absolutely impossible in such necessarily fragmentary notes as these to convey an adequate idea of the rare beauty of the original. It is simply crowded with detail, yet without any appearance of over-elaboration, and every portion is executed with a skill which would do credit to any age or people.

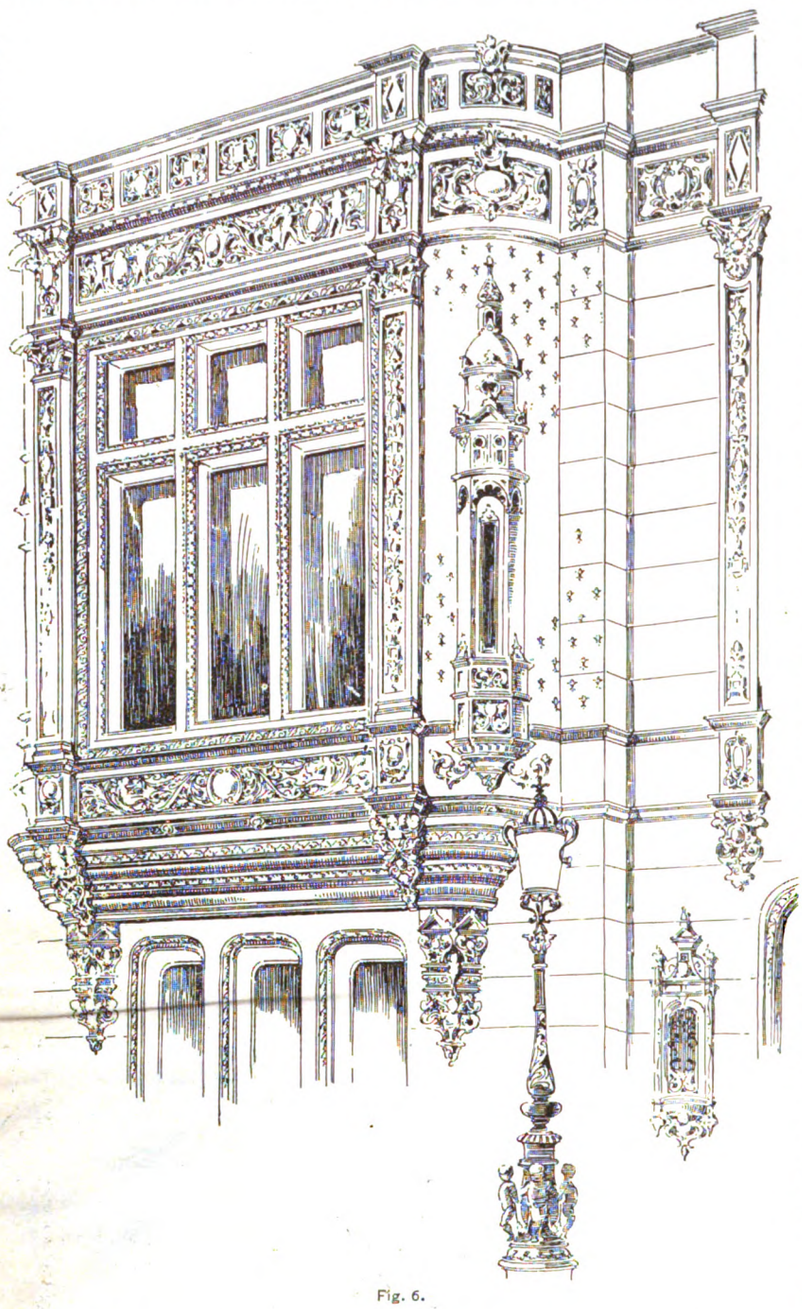


Fig. 6.

Unfortunately, the necessity of sketching it, surrounded by a crowd of inquisitive representatives of the rising generation of Holland, and under the *surveillance* of sundry imposing officers of the law, rendered it impracticable to obtain more than a general impression, but even that is worthy of reproduction. In Figure 8 is shown another departure from the style of the country, and in this case the Italian Renaissance is the mode adopted by the architect. It is a scholarly and well-thought-out study, and both proportion and detail convey a sense of satisfaction to the eye. Here, then, we have an interesting comparative demonstration of three phases of the Renaissance: the Italian, — the parent style — as shown in Figure 8, the Dutch, as fairly represented by Figures 1, 2, 3, 4 and 5, and the French as indicated in Figures 6 and 7; each possessing charms peculiar to themselves, and the outcome of the characteristics of the country of their origin. The remaining sketches require but little comment, as they are self-explanatory. Figures 9 and 10 are two thoroughly typical gateways of ancient date, while Figure 11 represents a class of window of which there are many in the city from whence it comes. The people of the Netherlands are very fond of introducing metal grilles to the front doors of their houses, and Figure 12 — one of a pair — will give an idea of the treatment adopted in such cases. Wrought-iron signs, too, enhance the attractiveness of the thoroughfares, and one of these is portrayed in Figure 13. Did space permit, many more examples of a description equally quaint and picturesque might be added, but those which appear herewith will, I think, go to show that to all who take a delight in using their pencils, even on a holiday ramble, a sojourn in this quaint old Dutch city may be made not only intensely pleasurable, but thoroughly interesting and instructive.

R. Davis Benn.

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RECENT COMPETITIONS. — THE NORTH SEA CANAL. — THE EXHIBITION OF 1896. — AUSTRIANS AND GERMANS CRITICISING ONE ANOTHER'S WORK. — SEMPER *vs.* HASENAUER.

BERLIN, GERMANY, May 22, 1895.

OF late, Berlin has been seeing a long array of architectural competitions. They seem to have been well managed as no complaints are heard of. The excellent method of having mixed juries to assess the plans is now common, and has been found to work well. The juries, mostly, have consisted of five members, three of whom are architects; the others, representatives of public opinion. Among the more important of the competitions, there was one for the town-hall at Stitchgart, and one for a memorial-hall to the late Emperor William, at Barmen. There are yet a number in view: among them, two for a town-hall and a museum at Hanover. Civil engineers, also, have been having a series of competitions — the most notable among these was one for a new bridge over the Rhine at Bonn.

Much interest is being shown in the plans of the grounds for the great Berlin Industrial Exhibition of 1896. The site, which is in the suburb Trepstow, on the banks of the River Spree, is a good one. It is well wooded and has good communication with the city. The area is approximately the same as that of the Paris Fair of 1889. The Berlin show promises to be very systematically arranged, and the buildings have been well thought out. Three architects are acting for the committee in charge of the works. They are Messrs. Schmitz, Hoffacker and Griesebach, all well known in their profession. The main building covers an area of 50,000 square yards.

The great event of the moment, however, is the opening of the North Sea Baltic Canal. Architecturally, there is little of interest in this wonderful piece of construction. One of the bridges show some good lines, and there is a memorial-hall to the late Emperor William, of some architectural pretension. It would be wrong, however, not to point out that all the engineers' stonework, the ironwork, such as railways, etc., have been carried out with some attention to their appearance and the designs of such details are neat.

Now that the new Houses of Parliament have been duly opened, and both Emperor William, the leading art critics and the architect's own *confrères* have had their say as to the merits of the new structure, our German contemporaries and the Berlin local press have opened a campaign against an Austrian critic who has not only literally pulled the new home of the "Reichstag" to pieces, but also inveighed roundly against all modern architectural work to be found in Germany's gay capital. This campaign against the Austrian critic has developed into a general attack on Austrian architecture of to-day, and wholesale condemnation is being indulged in on both sides. As outsiders, we may safely say that both the Austrian and the German critics have some reason to complain. In one case, *i. e.*, at Berlin, we, however, find that after many years of mediocre work and a period of senseless over-decoration, some very good things are now being done. A new school has been formed at the German capital and is showing us how well the thoughtful Berlin practitioner can adapt the old national work of his country, the so-called German Renaissance, to the requirements of to-day. In the other case, *i. e.*, at Vienna, we find how a wonderful period, like the years 1870-1890, which was full of academical work of the first order, can suddenly be followed by meaningless pastry-cook architecture of the worst type. At Berlin, the good results of late years are due to the more sensibly managed studies of the younger generation of architects, whilst at Vienna the great deterioration is the outcome of a lack of industry on the part of the Viennese youth.

The Austrian criticisms of the Berlin work, injudicious as they were, will, no doubt, have been of some service to the Germans, but we are sure the counter criticisms they called forth should be of far more value to the Viennese who have now had due warning of the opinion with which their latest freaks in confectioner's architecture are met with outside their own country. People who live in glass houses must not throw stones.



Fig. 7.

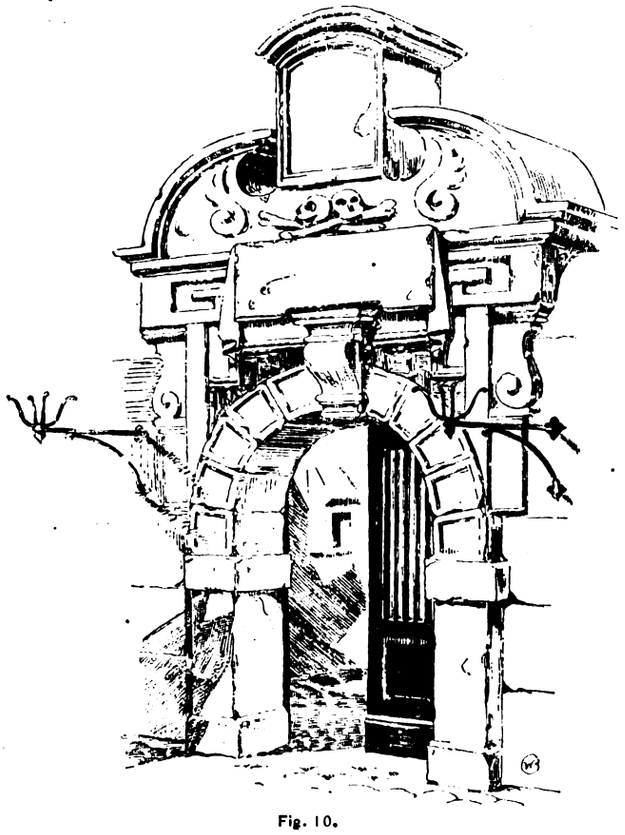


Fig. 10.



Fig. 12.

Speaking of controversies, we must mention a dispute as to the relative shares of the deceased Baron Hasenauer and Gottfried Semper in the design of the Court Theatre, at Vienna, a building better known by the name "Hofburg Theater." The Continental technical press has revelled in this unseemly controversy. We, ourselves, would have thought that any architect who sees the structure in question would at once recognize "what is what." Though the late Baron Hasenauer had the responsibility of the work, there is no doubt that the general design of the building was Semper's, and that he was further responsible for much of the exterior detail. Baron Hasenauer can well claim the effective decoration of the interior. It is a pity the Baron's friends want to make more of his share in the design than needs be, as the exact relation of the colaborators can be so easily proved by documents and eye-witnesses. To be fair, what the world generally ascribes to Baron Hasenauer alone should be put down to Messrs. Semper and Hasenauer.

GROWTH OF THE EUCALYPTUS. — In the *Scientific American*, Ernest Robinson, of New Jerusalem, Cal., declares that one of his neighbors recently "chopped down a eucalyptus tree which he had planted nineteen years ago. The tree yielded four cords of stove wood and the measurements were as follows: Height, 63 feet; circumference at base, 12¼ feet; circumference just below the first limb, eight feet from the ground, 8¾ feet."

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SOCIETIES

MEETING OF THE BOARD OF DIRECTORS OF THE AMERICAN INSTITUTE OF ARCHITECTS.

A MEETING of the Board of Directors of the American Institute of Architects was held at the office of the President, D. H. Burnham, The Rookery, Chicago, June 3, 1895.

President D. H. Burnham in the chair.

The Treasurer reported:

Cash on hand, October 1, 1894	$ 115.44
Receipts to date	2,974.43
	$3,089.87
Expenses to date	2,033.77
Cash on hand, June 3, 1895	$1,056.10

It was *Voted*, That the Secretary, in consultation with the Committee on Headquarters shall have authority to terminate the present arrangement regarding headquarters in New York City, and he is directed to take possession of the effects of the Institute, and, at the expense of the Institute, provide suitable storage for the same.

The Secretary stated that Mr. Bloor's sickness had prevented his completing the data for the history of the Institute, but it was in a fair state of forwardness.[1]

An application from seven Fellows of the American Institute of Architects in Texas, that they be granted a Charter under Constitution and By-laws of the Institute, was submitted, and also an application that the members of the Texas State Association be admitted as a body without submitting themselves to an individual letter-ballot. The Secretary's reply, that the latter request could not be granted, was approved, and he was requested to endeavor to bring about a reconciliation of existing differences before granting the Charter asked for.

A communication was received from an officer of the Wisconsin State Association of Architects, Milwaukee, announcing the reorganization of the Association and giving a list of the officers.

The Secretary presented a copy of a draft of an Act to Regulate the Practice of Architecture in California, indorsed by the Southern California and the San Francisco Chapters, which was received and placed on file, and he stated that efforts were making in New York and Illinois to the same end, but that in neither State had such Act become a law.

A communication was read from Mr. A. H. Thorp, asking about the return of the competition plans for the New York City-hall, whereupon it was *Voted*, That the Secretary be directed to inform Mr. Thorp that the matter should be referred to the New York Chapter, as it was not the function of this Board to interfere in local matters of this kind with which it had never had any connection.

The letter-ballot of January 28th was opened and counted, and it was found that 216 ballots were cast and that Charles T. Mathews of New York, N. Y., and Charles W. Hopkinson of Cleveland, Ohio, were elected.

Applications for admission to Fellowship were considered, and the Secretary was directed to issue a letter-ballot containing the following names of candidates for election: Julius Kastner, Bradford L. Gilbert and George Keister, New York, N. Y.; Edgar M. Lazarus, Portland, Ore.; Max Reutti, Hamilton, O.; William J. Marsh, Washington, D. C.; Francis R. Allen, Boston, Mass.

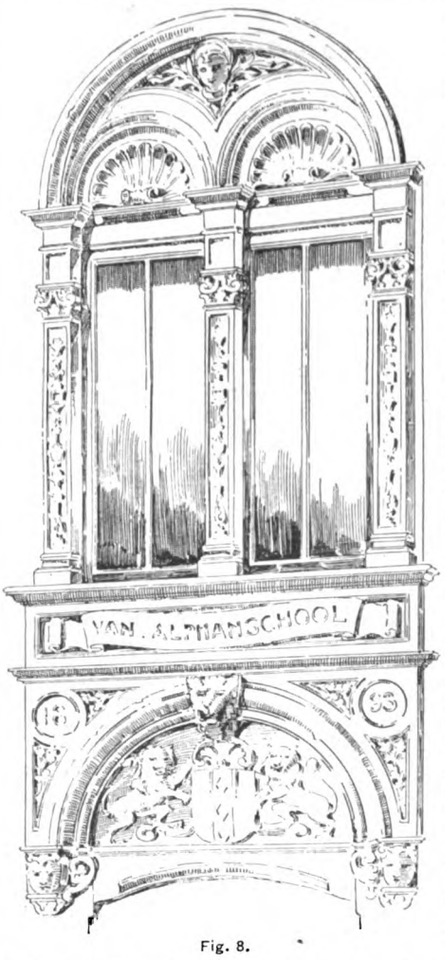


Fig. 8.

An application of James B. Cook for re-instatement as a Fellow of the American Institute of Architects was received and accompanying documents were read, whereupon it was *Voted*, That Mr. James B. Cook, of Memphis, Tenn., be re-instated as a Fellow of the American Institute of Architects.

A communication in favor of the claim of the heirs of the late Thomas U. Walter against the United States, for services as architect of the Capitol extension, was received, and it was voted to recommend that a fitting memorial for presentation to the next session of Congress be prepared, and if approved by the coming convention of the American Institute of Architects in October, that it be forwarded to the claimants properly indorsed, as officially coming from the American Institute of Architects, and that Robert Stead, of New York, and W. W. Clay, of Chicago, be requested to prepare a memorial as suggested, and present the same at the next annual convention for action thereon.

In the matter of the return of the plans submitted by Bruno Schmitz of Berlin, Germany, in the competition for the Grant Monument, the Secretary reported that he had not as yet been able to find where they were. General Horace Porter had put the matter into the hands of the Secretary of the Monument Commission for investigation, but so far without visible result. The Secretary was directed under the advice of the Committee on Foreign Correspondence

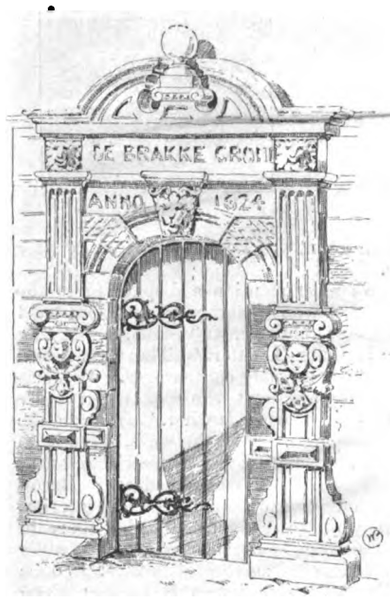


Fig. 9.


Fig. 11.


Fig. 13.

[1] Since the meeting, the Committee, consisting of Messrs. R. M. Hunt, George B. Post and E. H. Kendall, has forwarded to the Secretary a voluminous collection of most interesting data prepared by Mr. Bloor.

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to write to the Architectural Society at Munich, setting forth the action taken by this Board and expressing its sympathy and disapprobation of the proceedings of the Grant Monument Association.

The Secretary read the correspondence between Mr. R. W. Gibson and himself in reference to the code of competitions issued since the last annual meeting, in which Mr. Gibson objected to the clause discouraging the use of perspective drawings. Received and placed on file.

Letters on the ethics of architects in regard to soliciting work and doing work below schedule rates were read, and after discussion the whole matter was referred to Mr. Cass Gilbert, Mr. Louis H. Sullivan and Mr. W. W. Clay to report at the meeting of the Board of Directors in October.

The Secretary read to the Board, letters in reference to the awarding of medals for exhibits, whereupon the following resolutions were passed:

Resolved, That the Board of Directors of the American Institute of Architects hereby declares that it does not approve the award, by the Institute or Chapters thereof, of medals, or the expression in any other form of approval or indorsement of persons, material or workmanship in connection with inventions, devices or things made to be used in the erection or equipment of buildings.

Resolved, That the Secretary be and hereby is directed to send a copy of the above resolution to the Secretary of each Chapter of the Institute.

[Adjourned to 10 A. M., Tuesday, June 4th.]

Tuesday, June 4th.— President Burnham in the chair.

The Secretary announced that Mr. R. M. Hunt had, on account of his health, resigned from the Committee on Foreign Correspondence.



Fig. 14.

The Secretary read a circular letter from Mr. E. L. Corthell in regard to forming an International Institute of Engineers and Architects, whereupon the Secretary was directed to write a letter of approval of the plan to Mr. Corthell.

The Secretary announced that the President had appointed Messrs. George B. Post, Cass Gilbert and W. W. Clay as a Committee of the Institute on the St. Louis Convention, to act with the local Committee consisting of Messrs. A. F. Rosenheim, Charles K. Ramsey, Thomas C. Young, W. B. Ittner and E. A. Manny.

The Secretary reported that he had had some correspondence on the subject of forming a Chapter of the American Institute of Architects in Montreal, Canada. The Secretary was directed to continue and enlarge the correspondence with a view to bringing about so important an end.

Inasmuch as the Secretary has made a full summary of all the Chapter reports, he was directed not to print them *in extenso*, in the "*Proceedings* for 1894."

After a long and interesting discussion in regard to designing Federal Buildings, the following resolution was unanimously adopted:

Resolved, That the President appoint a Committee to investigate and report upon the present method of designing and erecting United States Federal Buildings, and to report upon the best method of elevating to a higher standard the architecture of such buildings.

The said Committee being authorized to draft such a bill to this end as may seem to him proper, and to report the same to the next meeting of this Board.

The following persons were named as said Committee: R. M. Hunt, Charles F. McKim, George B. Post, Robert Stead, James G. Hill, Bruce Price, John M. Carrère, Alfred Stone, Cass Gilbert, Louis H. Sullivan.

The following persons have tendered their resignations as Fellows of the Institute, and it was voted to accept the same: S. V. Stratton, D. W. Millard, Osborne J. Pierce, Greg. Vigeant, J. W. Ross, Adriance Van Brunt, H. W. Phillips.

The Secretary read a communication calling attention to a programme for submitting plans in competition for an Art Building at Fairmount Park, Philadelphia, and after a full discussion of the question, it was *Voted*, That while the Board strongly disapproves of such projects of competitions as that issued by the Commissioners of Fairmount Park, a copy of which has been submitted to the Board, as manifestly unfair in its conditions, it cannot take up individual cases of this kind, but enunciating general principles familiar to the Fellows of the Institute, it expects its individual members and local organizations to deal with specific cases.

It, therefore, directs the Secretary to communicate these views to the Fellow calling attention to the same, to the Chairman of the Board of Park Commissioners, to the Philadelphia Chapter of the American Institute of Architects, and to the Philadelphia Society of Fine Arts, enclosing his correspondence on the subject.

It was *Voted*, That in the interim between the meetings of the Board of Directors the Executive Committee shall have full power to act for the Board on all matters requiring consideration.

[Adjourned to meet in St. Louis before the annual convention, unless sooner called by the President.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF WILLIAM CRAMP, ESQ., 242 SOUTH 16TH ST., PHILADELPHIA, PA. MESSRS. HAZELHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

[Gelatine Print issued with International and Imperial Editions only.]

NEWPORT HOSPITAL, NEWPORT, R. I. MR. WILLIAM ATKINSON, ARCHITECT, BOSTON, MASS.

OF the buildings shown upon the plan, the surgical building, private ward, one of the wards for women, and one of the wards for men are built. The old hospital building (not shown) serves as an Administration building for the present; it being designed to build the rest of the buildings in the future.

TOMB FOR WILLIAM SHARON, ESQ., SAN FRANCISCO, CAL. MR. A. PAGE BROWN, ARCHITECT, SAN FRANCISCO, CAL.

THIS tomb, at Laurel Hill Cemetery, San Francisco, Cal., is built of rubbed, light-pink Tennessee marble, executed by Messrs. R. C. Fisher & Co., New York.

DESIGN FOR A PROPOSED BUILDING ON MARKET ST., SAN FRANCISCO, CAL. MR. WILLIS POLK, ARCHITECT, SAN FRANCISCO, CAL.

HOUSE FOR J. P. OMANS, ESQ., BRIDGEPORT, CONN. MR. J. W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

A DOUBLE COTTAGE. MR. R. BROWN, JR., ARCHITECT, BOSTON, MASS.

COTTAGE FOR J. MCILHENNY, ESQ., PELHAM, GERMANTOWN, PA. MR. G. T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

[Additional Illustrations in the International Edition.]

RESTORATION OF A CHÂTEAU AT TEST-MILON, [YONNE], FRANCE. M. RENÉ SERGENT, ARCHITECT.

[Copper-plate Photogravure.]

REAR ELEVATION OF THE SAME.

[Copper-plate Photogravure.]

DETAILS OF THE READING-ROOM: HOUSES OF PARLIAMENT, BERLIN, PRUSSIA. PROF. PAUL WALLOT, ARCHITECT.

THIS plate is copied from *Architektonische Rundschau.*

DETAILS OF THE GREAT COUNCIL-ROOM: HOUSES OF PARLIAMENT, BERLIN, PRUSSIA. PROF. PAUL WALLOT, ARCHITECT.

THIS plate is copied from *Architektonische Rundschau.*

AUDITORIUM OF THE NEW THEATRE ROYAL, CAMBRIDGE, ENG. MR. ERNEST RÜNTZ, ARCHITECT.

THE LIBRARY: THURLAND CASTLE, KIRKBY LONSDALE, ENG. MESSRS. PALEY & AUSTIN, ARCHITECTS.

PUBLIC LIBRARY, MANRESA ROAD, CHELSEA, ENG. MR. J. M. BRYDON, ARCHITECT.

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TRUMPINGTON ROAD BOARD SCHOOL, WANSTEAD, ENG. MR. J. T. BRESSEY, ARCHITECT.

This school, standing in the Wanstead School Board district, and providing accommodation for 1,200 children, was opened on February 9, 1894. The building is planned with a large central hall on each floor, from which all the school-rooms and class-rooms open. The staircases are placed on each side of the mezzanines containing the lavatories and teachers' rooms, and are so arranged that both flights are available from either of the upper floors in case of need. The teachers' rooms, which are of exceptional size (26′ x 16′ 6″), have on each floor bay-windows overlooking the halls of their respective departments, as well as bay-windows commanding the playgrounds. Externally, the school has a plinth of red Stafford bricks up to the ground-floor sill-level, and above this the facings are of picked-stocks with red-brick bands, dressings and moulded courses. Portland stone is used for the doorways and copings. Internally, the building on each floor is faced with a brown salt-glazed brick dado, 4 feet 6 inches high, and above this with white Suffolk bricks.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"A NORWEGIAN HOUSE."

Washington, D. C., June 28, 1895.

To the Editors of the American Architect:—

Dear Sirs,—I read with much interest Mr. Sibbald's account of the Norwegian house which appeared in your June 22d number. If he would furnish you with some sketches of the details, it would be interesting to many of your readers, and might set them thinking of some method to improve the present poor construction of our wooden houses, which are in my humble opinion a disgrace to an eminently utilitarian people.

Some of Mr. Sibbald's descriptions of the various parts were not quite clear to me, partly on account of my stupidity, but more because I am interested in the subject and wish to be certain I am right in my deductions. As described, it seems to me it could be improved, without injuring its evident superiority to our construction.

The six inches stated as the thickness of the outside vertical wall timbers, is unnecessarily thick even for non-conducting purposes.

The building could have a full frame in the usual manner, setting 4″ x 4″ studs at all openings; between these could be laid 2″ x 4″ rough plank, 2″ up, each one nailed through to the one under, so proceeding from sill to plate: This for the shell.

The outside to be covered with felt or waterproof paper, then shingles, clapboards, siding, or such weather covering as local custom may require.

Inside, the walls may be covered with cement plaster, or panelling as stated for the Norwegian house. If there is but one inch of panelled woodwork between the slated roof of this Norwegian house, and the tenants' heads, the attics as well as tenants will be very warm in summer.

Two-inch tongued plank on the roof, covered outside with rough battens one inch high to receive the slate, the space between battens filled-in with rough mortar, or at least *something*, will keep out the heat or cold most effectively. In one point, it seems to me, Mr. Sibbald is in error: that is where he states the liability of this house to be completely destroyed by fire.

On the contrary, it will (barring the defective roof) be very hard to ignite, and harder yet to burn up. His English friend's house is an exceptionally good "fire-risk"— unless some architect erects a modern fireproof building on the adjoining lot. G. R. T.

THE COMPETITORS OF THE ÉCOLE DES BEAUX-ARTS.

K. K. Polytechnikum, Vienna, May 31, 1895.

To the Editors of the American Architect:—

Dear Sirs, — Why, in the name of sense, were not American students of architecture at the other greater European schools, besides the École des Beaux-Arts, invited to compete for the scholarship in the school at Rome?

Certainly the committee were aware that there are Americans inscribed at the Colleges of Florence, Vienna, Berlin, Dresden and Munich, schools none of them inferior to the Parisian; and I think we have been very unfairly neglected. I am sure all of us, like myself, are as much surprised as we are chagrined at such a partisan action.

Outside of France, the École des Beaux-Arts is recognized by Europeans as what it is, a great institution for the teaching of art, but not as ranking any higher than the aforementioned other institutions. It is ridiculous that we read and hear in our country of none other than the École des Beaux-Arts. The great anxiety of those Americans who have studied there to advertise themselves is principally the cause of this; they probably acquired this conceit from their contact with the people of the self-styled "Grand Nation."

I hope, in the future, the persons who have charge of the scholarship for the school at Rome will not neglect their countrymen at the less advertised schools of architecture in Europe.

Albert F. M. Lange.

[Should we undertake to express an opinion as to the relative merits of the Ecole des Beaux-Arts and other European schools, we might be accused of bias, so we will merely hint at one possible explanation why Americans prefer the Paris school. Judging by our correspondent's surname, he may be descended more or less immediately from one who obtained his own education at the Vienna school and so followed in his footsteps more or less as a matter of course. If not this, then it seems likely that in his family German may be daily used as often as English, and so it was natural to seek a German school rather than a French one. But most Americans of English descent find it easier to acquire a reasonable mastery of French than of German, so it is easy to understand why, other things being equal, they should elect Paris rather than Vienna as a place of residence while at school. Moreover, American architectural students always intend to travel as well as study, and French is a far more useful language for travelling purposes than is German. — Eds. American Architect.]

EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Chicago, Ill. — *Paintings by Manet:* at the Art Institute.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

A Relic of the Louisburg Siege on Harvard Library. — The iron cross, burnished with gold, which is over one of the entrances to the Harvard College Library (Gore Hall) was at the time of the 1745 siege of Louisburg taken from a Catholic chapel there, and brought to Massachusetts as one of the spoils of the victory. In 1877, Justin Winsor, the Librarian of Harvard College Library, found it in the cellar of the library, and had it gilded and placed in the position which it now occupies. The fact that an entrance to one of the main buildings of the oldest and most distinguished college in once Puritan Massachusetts should be thus adorned with a religious symbol which is usually to be found only on Roman Catholic buildings or on Anglican churches of an extreme type argues a religious liberality in these days which would make some of the anti-Catholic crusaders who took part in the Louisburg expedition lift their voices in stern rebuke of the degeneracy of their countrymen. But the world outgrows such baneful religious and partisan zeal. — *Boston Transcript.*

A Use for Obsolete Statuary. — Those who have seen the fruits of eccentric genius in London parks and streets will comprehend the humor in the following suggestion by the London *Telegraph:* There is no reason why Chicago's plan to circulate pictures should stop at pictures. Why should not "plastic art" be brought to the people for a moderate subscription? If the idea commends itself to the founders of the circulating gallery of Chicago, and they are prepared to give an international extension to their enterprise, we think we see our way to a "deal." There are statues in this country — nay, in this capital — by which our citizens have so long been "elevated" that we should now be glad to let some other nation have a chance with them. For a reasonable consideration we should be prepared to dispatch them across the Atlantic on a civilizing mission of almost indefinite length. They might circulate not only in Chicago, but through all the principal cities of the United States uninsured, and the Americans themselves should be allowed the utmost latitude in fixing the period for which individual citizens should be permitted to retain them in their houses. In some cases we should be prepared even to waive the condition of subscription altogether; and we are not sure that, in order to procure the inclusion of one or two of our statues — which shall be nameless — in the transatlantic circulating gallery of art, an arrangement for making the payment "on this side" would be very seriously objected to. These are the particular works of art which we should most gladly contribute to the advancement of aesthetic culture among our kinsmen; but we are far from affirming that they are the only ones. We will not even limit ourselves to artistic productions, if the American nation would like us to extend our benevolence to specimens of nature's handiwork. There are many originals — many "living pictures," political and social — which we should not have the smallest reluctance to include among our consignment to the United States. We would give them the longest popular leave of absence, and allow the consignees the freest possible hand in dealing with them. Indeed, we should not mind agreeing to their being retained on the other side of the Atlantic until they had produced a visible effect on the civilization of the American people.

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The Newport Hospital, Newport, R.I.
William Atkinson, Architect.
First Floor Plan.

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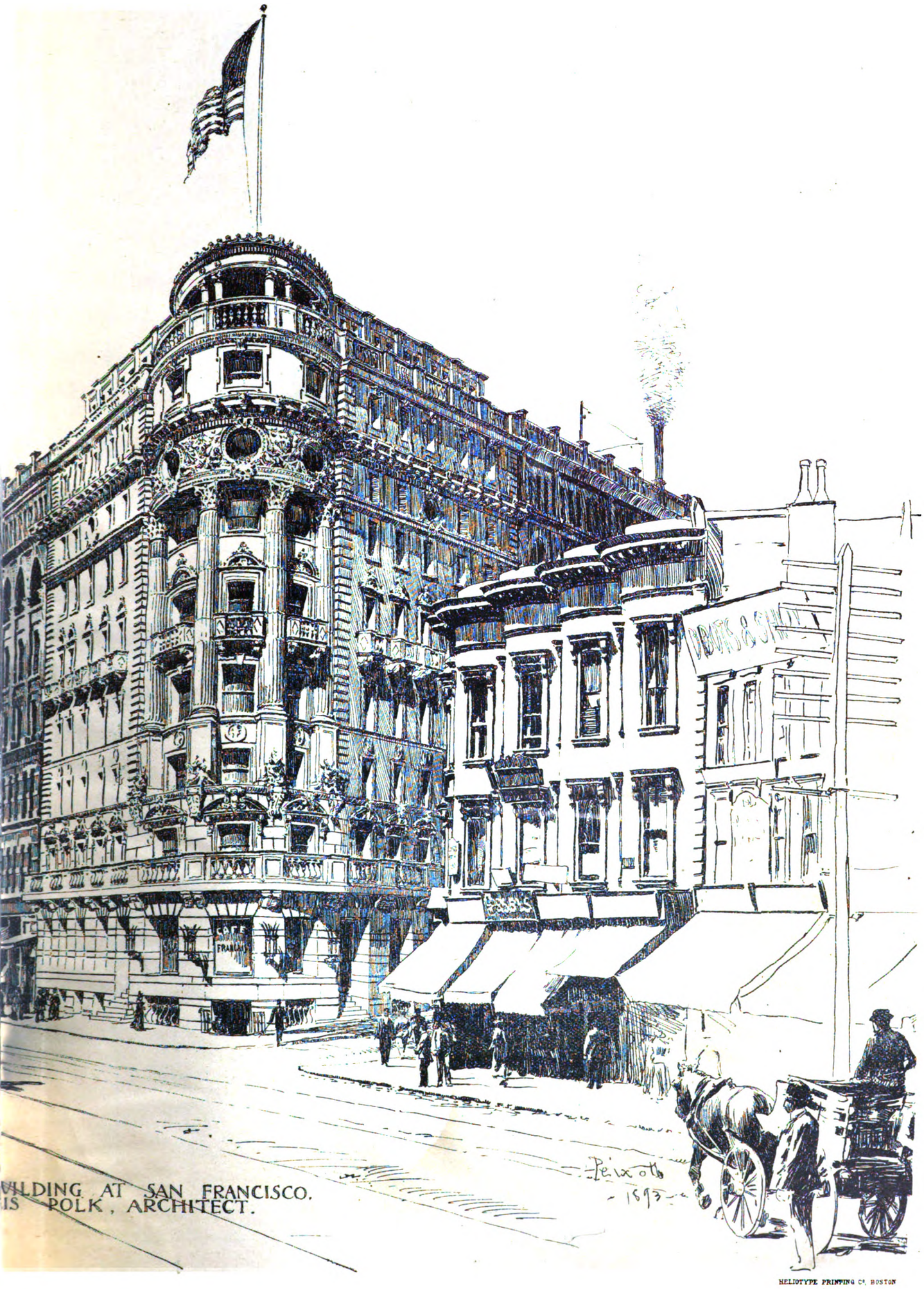
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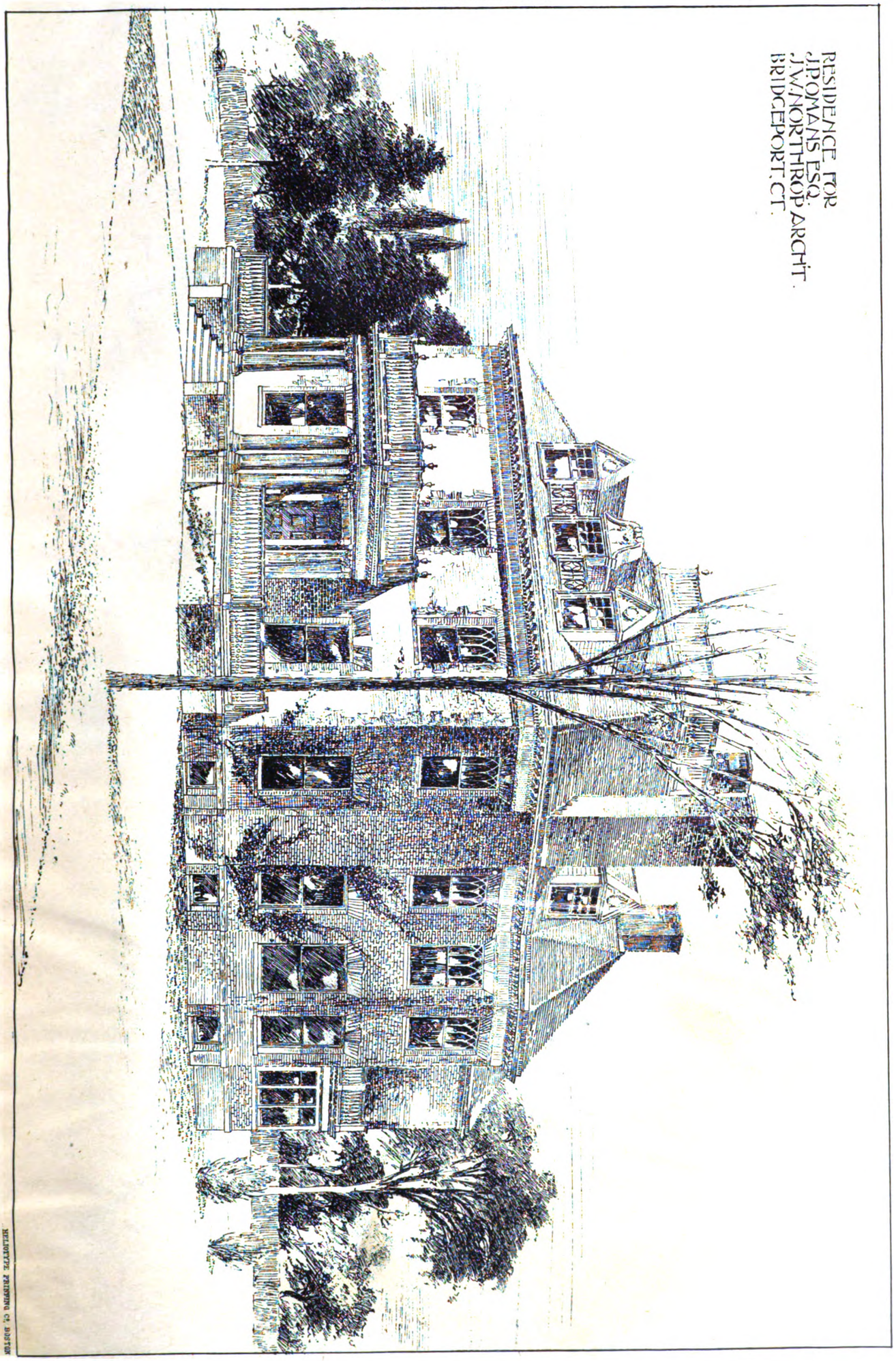
VILDING AT SAN FRANCISCO.
IS POLK, ARCHITECT.

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1895



SOUTH EAST

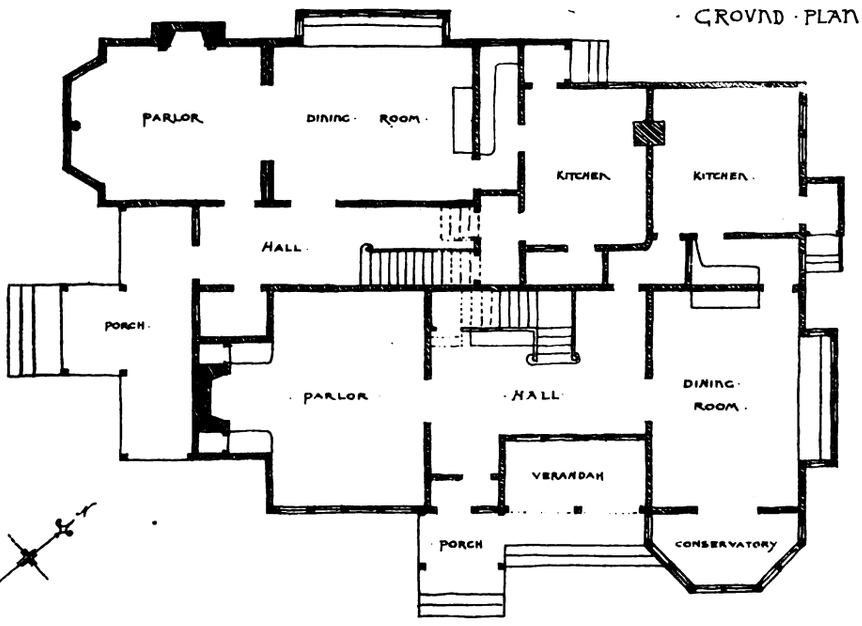


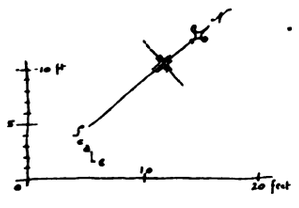
SOUTH WEST

A DOUBLE COTTAGE

R. BROWN Jr. ARCHITECT

GROUND PLAN



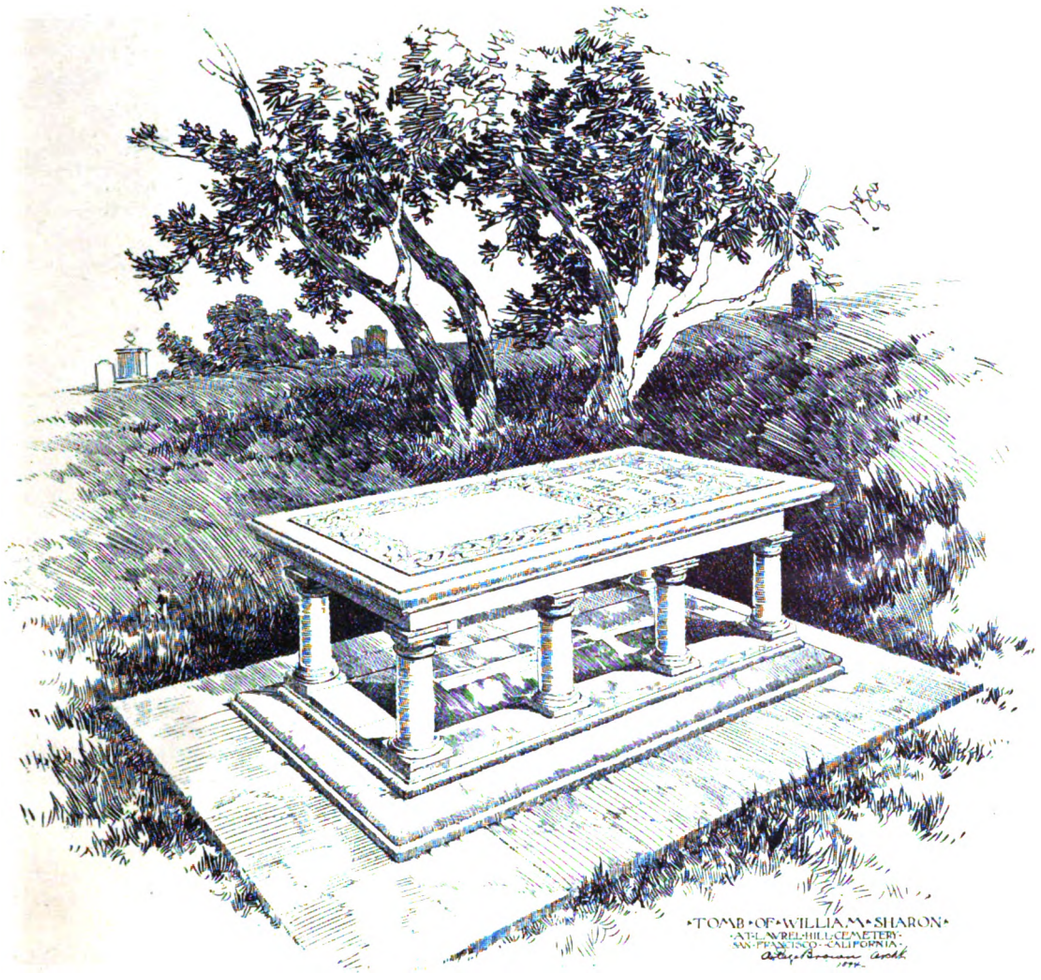


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JULY 13, 1895.

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THE late James Renwick, who was a rich man for an architect, left to the Metropolitan Museum of Art a collection of pictures which he had been many years in forming, and which is said to contain some good examples of Italian masters of the first rank of the cinque-cento period, besides a number of pictures by painters of the same school but of the second rank, such as Bronzino, Carlo Dolce, and others less known. Under his will, his pictures are to be kept together, in a room by themselves, and designated by name as the Renwick Collection, in the same way that the Wolfe Collection of modern French pictures is shown. As might be expected in the case of such a gift, a good deal of discussion has been raised as to the genuineness of the pictures in the collection. Pictures by Murillo, Rubens, Guido, Titian, Paul Veronese, Correggio and Velasquez are not to be had for the asking, particularly in New York, and the greater part of those sold there as genuine are undoubtedly copies, or mere impudent fabrications. Moreover, some of the more malicious critics say that Mr. Renwick had very little knowledge of pictures, and that the dealers in London, Boston and New York found him an easy victim to their representations as to the wares which they palmed off on him at extravagant prices.

MALICIOUS gossip of this sort is so likely to find credence, especially in this country, where very few people have ever seen a real old master, and have nothing but their imagination, or their prejudices, on which to base an opinion of the collection, that it is only fair, in the interest of the thousands who may later, if they study it without preconceived notions, derive much instruction from the Renwick room at the Metropolitan Museum, to give some warning against it. It is probable that a part of the sarcasms which are levelled by newspaper reporters at the collection derive their origin from the fact that very few people were allowed to see it in the later years of Mr. Renwick's life, and people are disposed to sneer at what they are not allowed to look at; but this was not always so. A considerable part of the collection originally belonged to Mr. William H. Aspinwall, whose eldest daughter married Mr. Renwick. During Mr. Aspinwall's life, his pictures were shown with the utmost courtesy to any one who came properly introduced, and most New Yorkers of middle age, who care for such things, have probably seen them. In this collection, as it existed twenty-five years ago, were some very beautiful pictures. Whether they were all genuine examples of the great masters whose names they bore we will not pretend to say, but that some of them were we had the satisfaction of being assured by a man who had spent twenty years in studying cinque-cento painting in Italy, and who passed for one of the best judges of such painting in New York. We incline to the opinion that collectors do best to buy their pictures without knowing or caring who their reputed authors may have been, and, according to the newspaper accounts, Mr. Aspinwall and his son-in-law, who made many journeys to Europe together for the sake of buying pictures, followed this rule, trusting their own judgment, which they fortified by examination of the accessible works of the schools to which they devoted their attention, rather than the representations of dealers. It was their custom to devote each trip to a certain small portion of Europe, which they could thoroughly ransack for such pictures as were purchasable; and it would be strange if two men of such intelligence, possessors already of pictures of unquestionable merit, could not, in thirty visits to those parts of Europe where the great schools of painting flourished, and where countless pictures must have been produced at the time when art was fashionable, have learned to distinguish for themselves the handiwork of the artists whose pictures they sought. Moreover, there were, twenty-five or thirty years ago, many more purchasable examples of the great Italian, Spanish and Dutch schools than there are now, and even now they are not altogether unattainable, so that, supposing half of the Aspinwall and Renwick pictures, which were united in one collection at Mr. Aspinwall's death, to be spurious, there is certainly room for believing that the other half may be genuine. If they are genuine, their value to the Metropolitan Museum will be incalculable. In comparison with the richness of the Museum collections of modern pictures, its poverty in works of the Italian schools of the sixteenth century is all the more striking, and the Renwick-Aspinwall collection of what one newspaper reporter contemptuously calls "red and blue Madonnas" must be indeed a monument of gullibility and folly, if it does not contain enough of the spirit of the greatest school of art that the world has ever known, to serve as inspiration to many of the students who, as we hope, are to raise our country to the highest rank in the artistic world, and who, at present, need nothing so much as the guide and standard which is to be found in the work of the Classical school.

MR. HOLMAN HUNT, who is favorably known in the artistic world for his investigations into the chemical reactions of pigments, delivered a lecture recently, in which he explained the difference between French and English art, by saying that the latter was founded on love, and the former on hate. His auditors seem to have been quite delighted at having this difficult question solved so clearly, and abstracts of his lecture have ever since been circulating through the English newspapers, no doubt to the great edification of their readers. So far as Americans are concerned, we fear that Mr. Hunt's explanation of the matter is rather too delightfully simple for what Mr. Ruskin calls their "peasant" wits. For ourselves, we confess, without hesitation, that, not being gifted with Mr. Hunt's and Mr. Ruskin's insight into other people's motives, we had supposed the main difference between French pictures and English ones to be that the former usually looked like something in nature, while the latter did not; but we are quite willing to apologize for the superficiality of our observation, and to beg that these critics will condescend to enlarge upon their too brief deliverances. For, as it is evident that both love and hatred must have some object, it is not only interesting, but important to know what it is that English artists love, and French ones hate, so that we peasants, in our humble way, may cultivate similar sentiments toward the objects thus kindly pointed out to us. To illustrate what we mean, we might, perhaps, venture to suggest that the love with which, as Mr. Hunt informs us, English artists are filled, has seemed to us, in some of the more renowned members of the profession, to be bestowed upon dirty color, affected expression and ridiculous drawing; while the spirit which animates French painters, and which, as Mr. Hunt says, is nothing but hate, is, as we are now quite convinced, really and truly a violent manifestation of that terrible passion, directed at affectation, pretence and artistic humbug generally. It is a little curious that such infernal thoughts, boiling eternally in their evil souls, should be able to inspire Jules Bréton, and Feyen, and Bonvin, and Haquette, and Frère, and a multitude of other French artists, with the sweet and simple thoughts which their canvases render immortal for the advantage of their fellow-men, while the loves of Mr. Walter Crane, and other lights of the English artistic world, seem to be unable to embody themselves in anything but soulless caricature; but, as we have just explained, everything depends upon the object toward which the sentiment of

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the artist is directed; and, if our artists cannot exhibit any sentiment more pleasing to the great English critics, they may, at least, console themselves with the idea that an energetic hatred and contempt for literary claptrap, ignorant self-assertion, and shams, falsities and hypocrisies of all descriptions, is, so far as the example of the French painters can teach us, about as good a preparation for their work as the present range of human sentiment affords.

A MR. RIMINGTON has been exhibiting in London a curious instrument, intended, as he says, for the development of a new art. This art is based, as he explains it, on the fact that sound and light are both produced by vibrations of elastic media; and that variations in color are produced by variations in the rapidity of vibration of the luminiferous ether, as variations in sound are produced by changes in the rapidity of vibration of the air. It is well known that the violet waves of the spectrum are about half the length of the red waves, just as the air, in producing a given note, vibrates twice as fast as in producing the same note an octave below; and the observation which every one has made, that the violet band of the spectrum shades at its outer, or most quickly-vibrating extremity, into a decided red, as if echoing the true red rays at the most slowly vibrating end of the spectrum, has been taken as indicating that, beyond the color-octave visible to our eyes, another octave of invisible color may begin, just as, in music, a second and third and fourth octave are formed by sound waves vibrating with twice or three times or four times the rapidity of those in the first, or lowest octave. These analogies between the two sorts of vibrations, besides others in the way of interference and so on, are quite sufficient to tempt philosophers of a speculative turn to further investigation, and Mr. Rimington has had the ingenious idea of constructing an instrument which, at the same time that music is played, throws upon a screen light of the color in the spectral scale corresponding to the given tone in the musical scale. The exhibition of this instrument at St. James's Hall drew a great concourse of people, including, as the *Builder* informs us, a considerable number of architects. Considering that only one color-octave is visible to our eyes, the musical part of the entertainment can hardly have been very varied, but the combinations of color which appeared on the screen in correspondence with the chords were extremely curious. The editor of the *Builder*, who joins to his other accomplishments a remarkable knowledge of what may be called the possibilities of music, observes, with justice, that Mr. Rimington's system assumes a connection between sound and color which is almost purely arbitrary, since the notes of the musical scale are entirely conventional, and the selection of the colors corresponding to them must be, in our present knowledge of the laws of light, to a great extent conventional also, while the vibrations of the air differ in many ways from those of the ether. Mr. Statham himself makes a very curious suggestion, saying that, many years ago, the idea occurred to him of the possibility of composing light-symphonies, similar in some respects to musical compositions, and consisting in the exhibition of colored decorative forms, all based on what may be called a given melodic idea, successively and rhythmically on a screen. This sort of exhibition would be quite independent of any musical accompaniment, which, in the present state of our knowledge, could hardly be anything more than a burden and distraction, and Mr. Statham is undoubtedly right in thinking that an art of this sort might be carried to a high development. Meanwhile, Mr. Rimington's experiments will have an interest of their own. The interference and polarization of sound-waves has long been the subject of laboratory study, and, in return, color-chords can certainly be investigated with profit.

M. CHARLES LUCAS, in *La Construction Moderne*, gives a translation of the instructions written, about A. D. 500, by Cassiodorus, secretary and counsellor of Theodoric, King of the Goths, to two architects, Aloisius and Daniel, to whom the King had resolved to confide the direction of the work on certain new palaces and other buildings. Although Theodoric was, in many respects, more than half a savage, and reigned over a people more savage still, he understood and appreciated architectural art, as his buildings at Ravenna, his capital, still attest; and his secretary, one of the most accomplished men of the age, understood the duties of an architect much better, apparently, than modern public functionaries do. After speaking of the beauty of the existing palace, at Ravenna, and of the pleasure that the King took, in his hours of leisure, in contemplating its perfections, Cassiodorus goes on to say that the architects will be expected, in their future work, to aim at the same artistic perfection. As an equipment for their task, he advises them to read frequently Euclid, in order that they may "engrave upon their minds," the "astonishing variety of figures with which he has enriched his book on geometry," and to have also "ceaselessly under their eyes the lessons of the profound Archimedes and of Metrobius," in order that they "may be fitted to produce new master-pieces." In regard to the style to be adopted in their designs, the secretary advises them that they will be expected "to attend diligently to the maintenance in its pristine splendor of everything antique," and, where they make additions to old work, to construct what they add "in the same taste." "For," as the secretary says, "just as a beautiful body ought to be clothed with a uniform color, so it is fitting that the same beauty and the same style should reign in all the members, and all the parts, of our palace." It will be observed that Cassiodorus seems to have been quite unmindful of the English reviewers who were to come after him, and who know, out of their infinite self-consciousness, that the mediævals and their predecessors, when they made additions to an older building, always made them in the style of their own day, instead of conforming to that of the original building; but it is a misfortune inseparable from chronological distance, that the earlier writers are unable always to conform to the sentiments which the later ones attribute to them. No doubt, if Cassiodorus had had the advantage of reading the works of Mr. Ruskin, or of seeing an Englishman's tennis costume, he would have modified his expressions on these subjects.

AS to what the architects would have to do, after their appointment, Cassiodorus informs them that they will be expected "to direct the mason, the sculptor in marble, the workmen in stucco and plaster, and the painter in mosaic." "You are required," he says, "to teach them that of which they are ignorant, and to resolve the difficulties proposed to you by that army of people who work under your guidance, and must have recourse to the light of your judgment." "You see," he adds, "what various knowledge must be possessed by him who has so many people to instruct; but you will reap the fruit of your labors, and the success of their work, which you have so well directed, will cast honor upon you, and will be your most grateful recompense"; and, still further to inspire them, he exclaims, "what more honorable employment, what more glorious function, than this which enables you to transmit to the most distant ages the monuments which will secure for you the admiration of posterity." After this, Cassiodorus seems to have been seized with a nervousness, for fear that the architects might use their opportunity to fill their pockets with money that did not belong to them, for he adds, that these honors will come to the architects only "if a mean cupidity never induces you to deprive the workmen of a part of our munificence." "Such men," he says, "obey readily, if they receive fair and adequate wages, without fraud or deduction. A generous hand encourages the genius of the arts, and all the ardor of the artist binds itself to his work when he is not disturbed by anxiety about subsistence." After this hint, he concludes by holding up another alluring view of the rewards of probity and skill. "Observe, further," he says, "what are the distinctions with which you are clothed: you march immediately before our person, in the midst of a numerous cortége, holding the rod of gold in your hands, a prerogative which, while entitling you to a place so near us, announces that it is to you that we have confided the execution of our palace." Considering the success with which the work of Theodoric and his architects was crowned, the idea of encouraging the latter by giving them gold rods to carry in procession seems to have been an excellent one, and we commend it to the attention of modern public bodies. Nowadays, the architect of a great public building is generally quite ignored by the functionaries for whom it is built. They take care to have their own names inscribed upon it, but disdain to allow that of the artist who created it to appear. The latter does not generally repine much at his exclusion from their company, but it is quite probable that if they would imitate Theodoric the Great, and show decent consideration for him, they would be more zealously, if not more successfully, served.

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ENGLISH COUNTRY CHURCHES.

CHEWTON MENDIP, SOMERSET.



Norman North Door, Chewton Mendip, Somersetshire, Eng.

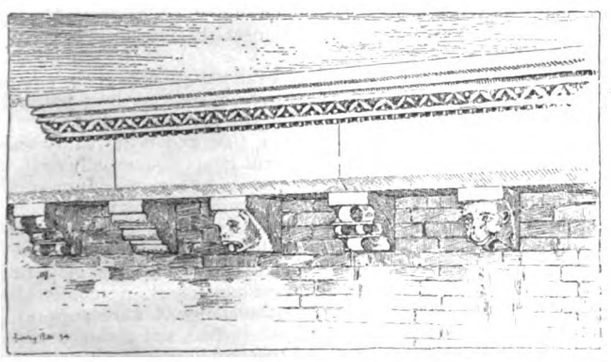
TUCKED away out of reach in the heart of the Mendip Hills, about six miles from the railway and the Cathedral City of Wells, there is in the modest village of Chewton Mendip a very interesting church, formerly a priory church.

Among a lot of very beautiful architectural features, one's interest, after the rich and graceful Perpendicular tower, will be aroused by a Norman door on the north side of the church. The doorway is in fairly good state and has suffered nothing from restorations. It has little ornament, the zig-zag of the third ring of the door-head arch being of a simple early Norman character. Very little of the details of the carved ornament of the capitals is still discernible.

The corbels under the bit of entablature which remains on the north chancel wall are less worn, having been protected under the overhang. There is a bit of the old wall left above the door. The stones of this are carefully jointed, but the masonry is not so perfect as in some existing examples of later Norman work.

There are, here and there throughout England in small churches, many such doorways surviving the entire remodelling of the churches to which they belonged. They were preserved, doubtless, as the only ornamented portions of those buildings. The Norman style sought more after simple massive effects than for ornament. The great churches built throughout England after the Conquest were gloomy and grand, but had less ornamental detail about them than the smaller ones they displaced. Norman Romanesque had already made its appearance in England in the time of Edward the Confessor, who introduced the style in his church at Westminster, in 1065, but after the Conquest the numerous incoming Norman clergy, who immediately invested every religious establishment of any value, imposed the style upon the whole of England. Its period extended to the end of the twelfth century.

There was a freer use of ornament in the later Norman, ornament applied mostly to doors, where it sometimes attained great richness. The walls retained for the most part their massive plainness. The insertion of columns in the jambs of doorways belongs to middle and later Norman. The cushion capitals, peculiar to the style, bear a rude resemblance to the Doric of Greece, while there was a sort of Ionic feeling in earlier capitals. Later ones approached the type of the Corinthian, and with this development of the style forms grew lighter and surface enrichment more elaborate, though still concentrated upon isolated portions, while the masonry was of the most finished workmanship.



Cornice of North Chancel Wall, Chewton Mendip, Somersetshire, Eng.

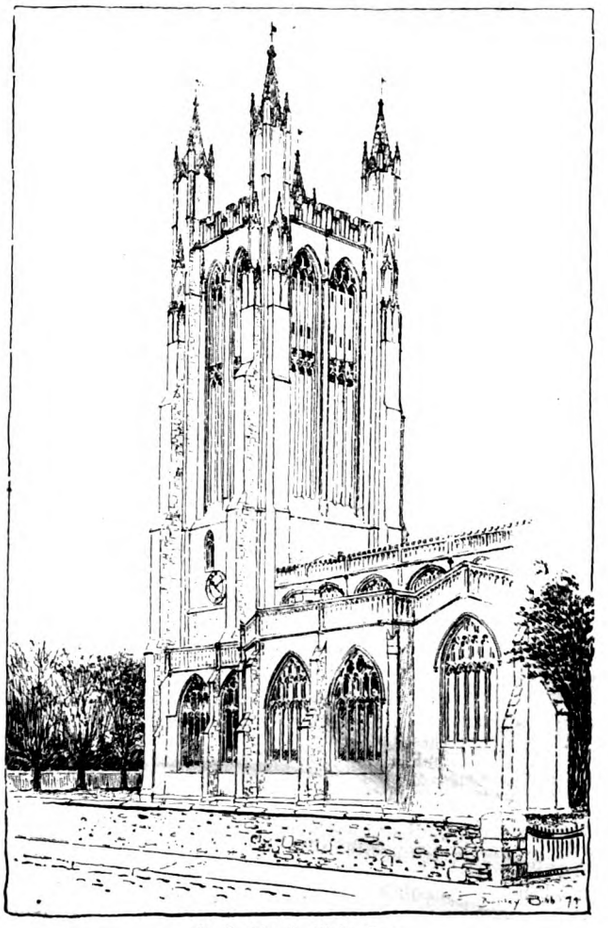
With the awakening of Gothic invention Norman work took on a transitionary character with some very elaborate and beautiful treatment of mouldings and rich detail, a very splendid example of which is existing in the glorious ruin of St. Joseph's Chapel at Glastonbury.

SAINT CUTHBERT'S, WELLS, SOMERSET.

In Saint Cuthbert's at Wells, we have a good example of the larger Perpendicular parish churches. In this church, which underwent in late Gothic times a complete transformation, there is little or nothing of importance from an earlier period: everything is in the later thoroughly developed Perpendicular manner. The tower is particularly characteristic of the style, and is certainly a most beautiful example of it. Nothing could be more entirely English than its treatment. Gothic was in its last stage in England, where its latest development had taken a form peculiar to that country, characterized by tremendous windows of formal tracery in the great churches, and a striking adherence to the use of the right line through the body of its structure and ornamental work.

The square-headed window came more into use in church work and was made very effective with vertical tracery. It was the time of western towers, and the most of English churches built one during that period.

Saint Cuthbert's is, in fact, a type of the large parish churches, not a minster church, that is not belonging to a college or monastery,



St. Cuthbert's, Wells, Eng.

which grew up in England in the Perpendicular period, especially in the West. These edifices may be said to contain what was best and most individual among the features of the vertical style.

The roof-pitch was quite low. On the outside the roof was hidden by a stone parapet, usually battlemented, as in the drawing of Dynder Church here given. Interiorly the roof was of very striking importance. There was no stone-vaulting usually, except here and there a bit of fan-vaulting, as at Saint Cuthbert's inside the tall arch which opens from the tower into the church, but the whole body of the church was covered by a low-pitched tie-beam wooden roof, rendered very beautiful and interesting with panelling and carving. The character of these roofs is suggested in the accompanying drawing of the nave of Saint Cuthbert's [See Illustrations]. They did not vary much in treatment from this one.

At Taunton, Saint Mary Magdalene's has a rich and beautiful wooden roof of this style, and Saint Thomas's, Exeter, shows two or three interesting forms of treatment. In the latter, the carved mouldings of roof-beams otherwise unpainted are picked out with color in red or blue and white, with occasionally, if I remember aright, a little gold. The wood itself is a splendid old brown, from age. The whole effect of the roof is dark, but the abundance of lace-like ornamental work lightens this impression. I think the angels were originally in white, perhaps white wood; they now look gray.

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The armorial bearings on the shields they hold were done in their proper heraldic colors.

The roof over the aisle of Saint Thomas's, in Exeter, is good in the matter of the absence of the trefoil ornament under the beams, which suggests rather what we would to-day term "jig-saw work," and in a greater simplicity and solidity in the strut pieces. The pitch, too, is lower.

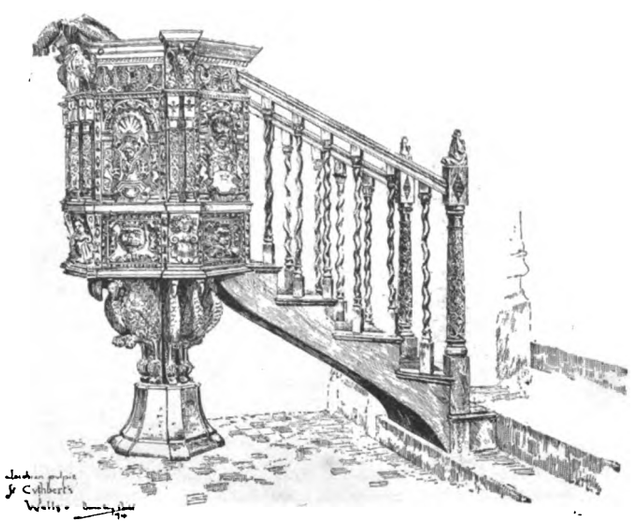
The slight lifting of the line of the tie-beam out of the horizontal is effective in the Saint Cuthbert's roof. The transition from the walls to roof is effected easily and agreeably by the manner in which brackets curve down from the tie-beams to rest upon short wooden columns, which are carried by stone pilasters borne on corbels, upon which are carven angels with books and shields.

There is no lack of homogeneity in the use of the wood and stone together in this way, nor does one regret the loss of the noble stone-vaulting of the earlier styles. In the smaller churches there were cradle-roofs at this time, and in the east of England the great hammer-beam roof was in use.

In the tower the principal changes to be noted were the absence of spire — not often found in Somersetshire Vertical churches — and the treatment of the battlemented parapet and enriched pinnacles.

At Chewton Mendip, as at Saint Mary Magdalene's, Taunton, the parapet is pierced very richly, but I preferred Saint Cuthbert's as an example because of the noble effect of its tall doubled belfry windows.

The visitor to Wells, if he has time and can tear himself away from the absorbing interest of the Cathedral and its surroundings, will find Saint Cuthbert's very charming. At least, he will often



Jacobean Pulpit, St. Cuthbert's, Wells, Eng.

look toward the west, where its tall square tower rises, and admire the grace of its four tall pinnacles, cutting against the sky.

The drawing of the Jacobean pulpit is given as an example of many such to be found in England.

CREECH SAINT MICHAEL, NEAR TAUNTON, SOMERSETSHIRE.

This simple village church standing in its quiet church-yard, in a very sleepy and inconsequential place not over three miles from the Town of Taunton in Somerset, at which latter the traveller of architectural bent will find an interesting monument of Perpendicular in the richly carved and elaborately pinnacled tower of Saint Mary Magdalene's, lately restored under Sir Gilbert Scott, this modest little Church of St. Michael of Creech St. Michael seems hardly worthy of much study. Having happened upon it one day and enjoyed there some hours of peaceful sketching, I give here the results for what they are worth [See Illustrations].

The old building labors under the disfigurement of a very rusty coat of stucco, doubtless the work of some Georgian vandal warden, and from under this cracked and dropping skin its few beauties of carving and tracery struggle with difficulty into view.

The square tower suggests in the lancet windows of its middle stage an early origin, and in the pilaster buttresses on its angles with the corbelling between them even an earlier date.

The traceries in the large windows of the west end of nave and north aisle are interesting examples of the later manner of continuing the mullions through the tracery which distinguished the Flowing and Perpendicular styles from the preceding Geometrical treatment. These windows at Creech are effective. The forms had still more or less ease and grace of line. Later, Perpendicular tracery took on a formal regularity which Mr. Ruskin finds too full of a monotonous panelling and tiresome repetition of rectangular division of spaces. The style did, in fact, have its origin in a particular treatment of wood-panelling at Gloucester Abbey, somewhere about 1300, where the use of the straight line in place of the curved one in the tracery was developed.

William of Wykeham impressed the style in its later thorough development upon the whole of England, at the end of the fourteenth century, and in the work of his pupil, Thomas de Beckyngton, Bishop of Bath and Wells, are to be admired some of its most splendid results.

A. B. Bibb.

ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — XII.

THE NATIONAL CODE OF RULES FOR ELECTRIC WIRING. — V.

Class C.

LOW-POTENTIAL SYSTEMS. — 300 VOLTS OR LESS. — OUTSIDE CONDUCTORS.

15. Outside Overhead Conductors: —

a. Must be erected in accordance with the rules for high-potential conductors.

b. Must be separated not less than 12 inches, and be provided with an *approved* fusible cut-out, that will cut off the entire current as near as possible to the entrance to the building and inside the walls.

[Section *b*. An *approved* fusible cut-out must comply with the sections of Rules 23 and 24 describing fuses and cut-outs. The cut-out required by this section must be placed so as to protect the switch required by Rule 17.]

The conditions to which outside wires are exposed are such that no difference can be made between the construction used for high-potential circuits and that used for low-potential circuits. Although there is less liability of leakage where the electrical pressure is low, there are still all the bad effects when leakage does occur and it is not advisable to attempt less rigid requirements. Rules under Section 10 accordingly apply also to low-potential circuits.

The fusible cut-out required just inside the walls is similar to that required for motors, shown in connection with Rule 8 (*a*). As with motor circuits, the cut-out is to be double-pole and it is to be placed as near as possible to the point where the wires enter the building, so that the whole of the interior wiring may be protected. If it were some distance away from the entrance, cross connections between the wires at any point lying between the cut-out and the wall would not melt the fuse in the cut-out, because the extra current would not pass through the fuse.

16. Underground Conductors: —

a. Must be protected against moisture and mechanical injury, and be removed at least two feet from combustible material when brought into a building, but not connected with the interior conductors.

b. Must have a switch and a cut-out for each wire between the underground conductors and the interior wiring when the two parts of the wiring are connected.

These switches and fuses must be placed as near as possible to the end of the underground conduit, and connected therewith by specially insulated conductors, kept apart not less than two and one-half inches.

[Section *b*. The cut-out required by this section must be placed so as to protect the switch.]

c. Must not be so arranged as to shunt the current through a building around any catch-box.

Underground conductors are usually brought into the basement of a building, where it is apt to be damp and where often there is not the best of order, so that it is necessary to take precautions against moisture and the abrasion of the wires that would be caused by piling objects against them. There is apt to be greater carelessness when the wires are simply brought in for future use, so there is the additional requirement in this case, that they be two feet from combustible material, as this might be set on fire were there to be leakage between the wires.

When the underground conductors are connected with interior wires a cut-out is needed for the reason stated under Rule 15 (*b*). The switch makes it possible to disconnect the interior wires from the main wires whenever necessary. The cut-out to protect the switch must be between the switch and the wall, so that if the switch become defective and allow an excessive current to leak between the wires, this current will pass through the fuse and melt it.

A "*catch-box*" is a box containing a fuse and is in reality only another name for a fuse-box. The term is applied usually only to the fuse receptacles in the underground street-service. In making the street-connections the wires are sometimes improperly connected so that they are not protected by the fuse in the catch-box, but form a by-path round it through the building.

In Figure 47, for instance, the wiring in the building may first have been connected only with the street mains *A*, no connection being made with the mains *D*. While the mains *A* were supplying all the current, if any trouble occurred so that the mains became connected at *B*, the excessive current that would flow in consequence at the short circuit would melt the fuse in the catch-box *C*. Suppose, however, that more lamps have been put in the building and that the current required is greater than the mains *A* were designed for: In this case there is sometimes another connection made at a point *D*, so that the current supplying the building will not all have to be

[1] Continued from No. 1015, page 102.

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taken through the mains *A*. Now, if a short-circuit occur at *B* the fuse in the catch-box *C*, even though it melt, will not prevent the wires from overheating, because the current can come from *D* through the wiring of the building to *B*. There would, of course, be fuses at the service-entrances of the building but it is bad practice to depend upon building fuses to prevent street damage, for it allows excessive currents to run unnecessarily through the interior wiring. With such an arrangement as that shown in Figure 47 either all the lamps should be run from one set of mains, or else the wiring in the building should be divided into two distinct parts and one fed from each set of mains.

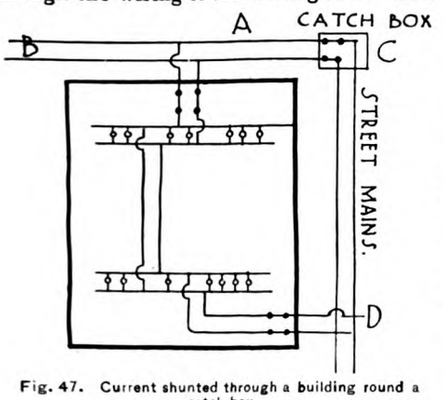


Fig. 47. Current shunted through a building round a catch-box.

INSIDE WIRING. — GENERAL RULES.

17. At the entrance of every building there shall be an *approved* switch placed in the service conductors by which the current may be entirely cut off.

[RULE 17 : —

The switch required by this rule to be *approved* must be double-pole, must plainly indicate whether the current is "on" or "off," and must comply with Sections *a*, *c*, *d* and *e* of Rule 26 relating to switches.]

This "*service switch*" is placed at the point where the wires enter the building for the same reasons that such a switch is used with high-potential circuits. [Rule 12 (*b*).] It is usually, however, placed just inside the building instead of outside. It is to be a double-pole switch, that is, one breaking both wires of the circuit as does that used in connection with the motor (Fig. 24). With such a switch, current may at any time be cut out of the building entirely and if a practice be made of turning it "off" every night, there is no question of electrical troubles at a time when no one is about. It is convenient too, when trouble occurs in any part of the installation, for it is not necessary then to wait for the arrival of someone having a knowledge of electric matters, but the current may be immediately cut off from the interior wires. The base of the switch must be of waterproof and non-combustible material, such as slate or porcelain, to prevent leakage and damage from arcing. The form may be like that shown in Figure 24 or it may be a double-pole switch similar to that shown in Figure 36.

18. CONDUCTORS : —

a. Must have an *approved* insulating covering, and must not be of sizes smaller than No. 14 B. & S., No. 16 B. W. G., or No. 4 E. S. G., except that in conduit installed under Rule 22, No. 16 B. & S., No. 18 B. W. G., or No. 4 E. S. G. may be used.

[Section *a*. In so-called "concealed" wiring, moulding and conduit work, *and* in places liable to be exposed to dampness, the insulating covering of the wire, to be *approved*, must be solid, at least three-sixty-fourths of an inch in thickness, and covered with a substantial braid. It must not readily carry fire, must show an insulating resistance of one megohm per mile after two weeks' submersion in water at 70 degrees Fahrenheit, and three days' submersion in lime-water, with a current of 550 volts, and after three minutes' electrification.

(See List of Wires, page 35.)

For work which is *entirely* exposed to view throughout the whole interior circuits, and not liable to be exposed to dampness, a wire with an insulating covering that will not support combustion, will resist abrasion, is at least one-sixteenth of an inch in thickness, and thoroughly impregnated with a moisture repellent, will be *approved*.]

It will be noticed that the insulating covering of wires used for low-potential wiring is to be the same as that required for high-potential wiring except where the work is entirely exposed to view throughout the whole interior circuits, and not liable to be exposed to dampness. For these excepted places the better grades of the wire termed "Weatherproof" meet the requirements. So-called "Underwriters'" wire is not allowed under any conditions.

No. 14 B. & S. (Brown & Sharp Gauge), No. 16 B. W. G. (Birmingham Wire Gauge), and No. 4 E. S. G. (Edison Standard Gauge) are all of nearly the same size, about one-sixteenth of an inch in diameter. The B. & S. gauge is the gauge commonly used in this country. No wire smaller than No. 14 B. & S. gauge is allowed except in conduit, because it is otherwise not strong enough mechanically. Small wires strung on ceilings may easily become stretched and thus not only be more liable to further damage, by the displacement, but the sectional area may by this stretching be so reduced that the wire will heat when the normal current passes.

b. Must be protected when passing through FLOORS ; or through walls, partitions, timbers, etc., in places liable to be exposed to dampness by waterproof, non-combustible, insulating tubes, such as glass or porcelain.

Must be protected when passing through walls, partitions, timbers, etc., in places not liable to be exposed to dampness by *approved* insulating bushings specially made for the purpose.

[Section *b*. Second paragraph. Except for FLOORS, *and* for places liable to be exposed to dampness, Glass, Porcelain, *metal-sheathed* Interior Conduit and Vulca Tube, when made especially for bushings, will be *approved*.]

The two last named will not be approved if cut from the usual lengths of tube made for conduit work, nor when made without a head or flange on one end.

c. Must be kept free from contact with gas, water or other metallic piping, or any other conductors or conducting material which they may cross (except high-potential conductors) by some continuous and firmly-fixed non-conductor creating a separation of at least one inch. Deviations from this rule may sometimes be allowed by special permission.

d. Must be so placed in crossing high-potential conductors that there shall be a space of at least one foot at all points between the high and low tension conductors.

e. Must be so placed in wet places that an air-space will be left between conductors and pipes in crossing, and the former must be run in such a way that they cannot come in contact with the pipe accidentally. Wires should be run *over* all pipes upon which condensed moisture is likely to gather, or which by leaking might cause trouble on a circuit.

f. Must be so spliced or joined as to be both mechanically and electrically secure without solder. They must then be soldered, to insure preservation, and covered with an insulation equal to that on the conductors.

[Section *f*. All joints must be soldered, even if made with the McIntyre or any other patent splicing device. This ruling applies to joint and splices in all classes of wiring covered by these Rules.]

Rule 18 (*b*) is not always properly read. Non-combustible tubes are always required in floors, but in walls, partitions, etc., they are required only in places liable to be exposed to moisture. [See remarks under Rules 3 (*c*) and 12 (*a*).] The only tubes in addition to non-combustible tubes thus far approved for dry places are the makes mentioned in the note under Rule 18 (*b*).

Rule 18 (*c*) is made to insure proper insulation of the wiring from the ground. (Figure 10 and remarks.) The wire, if not rigidly fastened so that it will be held away from conducting material, may by being struck or by sagging, come into contact with the conductor. While the aim of the rule is to keep the wire away from conducting material of any kind, the greatest danger comes from pipes because they are directly connected with the earth. Construction similar to that shown in Figure 48 will insure the separation. Conductors that are not connected directly with the earth, such as a nail driven into a beam, appear sometimes to be harmless, but it should be remembered that whereas a slight contact between the wire and the beam itself might result in virtually no leakage, a driven nail presents a comparatively large surface to the wood, and contact with the nail might in this case result in a considerable leakage and cause dangerous sparking.

Construction is allowed with low-potential systems that is not allowed with high-potential systems, and Rule 18 (*d*) is made so that there can be no possibility of contact between the two.

An air-space is required where wires cross pipes in damp places, because there would be danger of leakage over the surface of any material between the two, if this material were damp. If wires are run under pipes on which moisture gathers, the moisture may cause a cross connection between the pipe and the wires. (Fig. 49.)

All joints are to be soldered as with high-potential circuits. [See Rule 10 (*f*).]

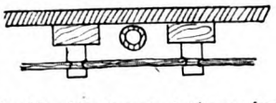


Fig. 48. Showing wire held away from a pipe which it crosses.



Fig. 49. Condensed water forming connection between pipe and wire.

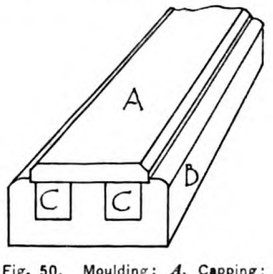


Fig. 50. Moulding: *A*. Capping; *B*. Backing; *C*. Grooves for wire.

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SPECIAL RULES.

19. Wiring not Encased in Moulding or Approved Conduit:—

a. Must be supported wholly on non-combustible insulators, constructed so as to prevent the insulating coverings of the wire from coming in contact with other substances than the insulating supports.

b. Must be so arranged that wires of opposite polarity, with a difference of potential of 150 volts or less, will be kept apart at least two and one-half inches.

c. Must have the above distance increased proportionately where a higher voltage is used.

d. Must not be laid in plaster, cement or similar finish.

e. Must never be fastened with staples.

"*Moulding*" is made in two pieces so as to wholly encase the wire, and it thus acts as a protection to the insulating covering. (Figure 50.)

"*Conduit*" is tubing that serves as a race-way or channel for wires, the building being piped with it as if for water or gas and

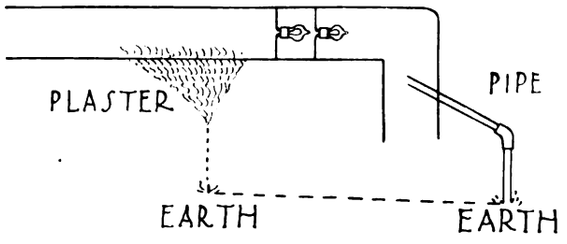


Fig. 51. Wires grounded through moist plaster and pipe, thus forming a cross connection between the two sides of the circuit.

the wire then run inside, so that the whole wiring installation is isolated and protected. (Rules *a* — *g*.)

The two wires of a circuit are wires of "*opposite polarity*." The convention has been adopted of calling the side of the dynamo from which the current is supposed to start the positive or + pole, and the side to which the current returns, the negative or — pole. The wires leading from the dynamo are thus spoken of as being of opposite polarity, one being the positive pole, and the other the negative pole of the circuit.

It will be noticed that there are only three approved ways of running wires: in moulding, in conduit, and wholly on non-combustible insulators. The intention of the Rule 19 (*a*) is to prevent possibility of leaks, and also to have the wire in contact only with non-combustible material so that no harm will come in case the wire gets excessively heated by a heavy current. While everything is perfectly dry there is no danger of leakage to wood for instance, and it was formerly the practice to fasten the wire directly against wooden ceilings; but it is not known when conditions may change by the spilling of water, or the leaking of roofs, and moreover the allowing of a poorer construction in some cases leads to the adoption of this construction in places where it is not at all suitable. There is then continually a necessity of drawing lines and it is but little more costly, but much safer and more satisfactory to use the construction everywhere, that is everywhere good.

A very short air-space is sufficient insulation with such pressures as are used in practice, but the distances between wires, specified in Rule 19 (*b*), are required because wires that become slightly loose are apt to come together unless they were originally some distance apart, and because leakage may take place over damp surfaces, and it is wiser not to make these distances too short.

Rule 19 (*a*) covers the construction mentioned in Rule 19 (*d*), but it is brought out specifically in the latter rule to give greater prominence and because it might be thought that plaster and cement were non-combustible insulating materials. On the contrary, they are fair conductors when moist and moreover they act on the insulating covering of the wire, destroying the insulating properties after a time. Even though no harm were done at the point where the leakage takes place in the plaster, such leakage might "ground" one side of the circuit and thus make possible at another point, as at a gas-fixture, a short circuit that would burn through the pipe and ignite the gas (Fig. 51).



Fig. 52. Metal staple.

The ordinary staple (Fig. 52) is of course a direct violation of Rule 19 (*a*), but staples are made that are insulated and that keep the wire out of contact with other substances. (Fig. 53.) These are also prohibited, however, for in fastening the wire with them they are driven into the wood and are liable to injure the insulating covering of the wire.

IN UNFINISHED LOFTS, BETWEEN FLOOR AND CEILINGS, IN PARTITIONS AND OTHER CONCEALED PLACES.

f. Must have at least one inch air-space surrounding them.

g. Must be at least ten inches apart when possible, and should be run singly on separate timbers or studding.

h. Wires run as above immediately under roofs, in proximity to water-tanks or pipes, will be considered as exposed to moisture.

i. When from the nature of the case it is impossible to place concealed wire on non-combustible insulating supports of glass or porcelain, the wires may be fished on the loop system, if encased, throughout in *approved* continuous flexible tubing or conduit.

j. Wires must not be fished for any great distance, and only in places where the Inspector can satisfy himself that the above rules have been complied with.

k. Twin wire must never be employed in this class of concealed work.

Wires are said to be "*fished*" when they are started in at one end of a concealed space and are then felt for, or "fished" for, from the other end, with a hooked wire or other contrivance so that they may be pulled through. Such a procedure leaves doubt of course as to the condition in the space between the entrance and the exit. Figure 54 illustrates wires "*fished on the loop system.*" The idea of the rule is to provide for construction in old buildings where it is not possible to conceal the wire by means of such construction as would be employed in new buildings. According to the rule, wire in a flexible conduit may be fished just as the wire alone would be fished, and is threaded-in through concealed spaces so that it makes the tour, so to speak, of all points where lamps are to be connected. The object of confining this construction to the loop system is to prevent joints being made in concealed spaces. The construction is intended principally for installations in which only a small number of lamps are used.

"*Twin wires*" are two wires laid together and surrounded and separated by insulating material, so that the whole forms one piece while the wires are separate conductors and form the two sides of the circuit. (Fig. 55.) Of course any jamming or bruising of this piece is apt to bring the two sides of the circuit into contact and thus form a short circuit.

In concealed spaces more rigid requirements are necessary than with open work, because the construction cannot be easily examined, any defect is more serious, and there is no temptation on the part of the workman to slight the work. Compliance with Rule 19 (*h*)

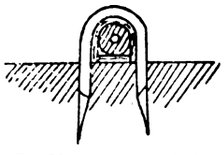


Fig. 53. Insulating staple.

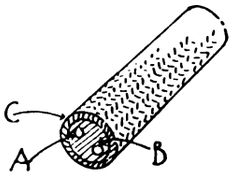


Fig. 55. Twin wire: *A*. Copper wires; *B*. Rubber insulation separating and surrounding copper wires; *C*. Braided outer covering.

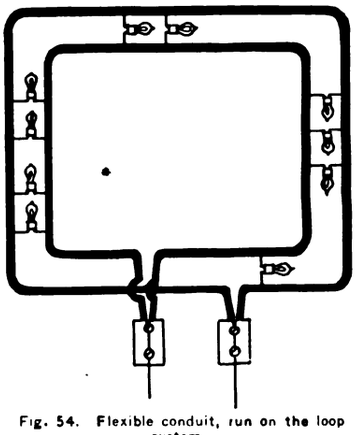


Fig. 54. Flexible conduit, run on the loop system.

requires non-combustible insulating tubes to be used where wires pass through walls, wood, etc., and allows only such wire and insulation as specified for places exposed to moisture.

20. Mouldings:—

a. Must never be used in concealed work or in damp places.

b. Must have at least two coats of waterproof paint or be impregnated with a moisture repellant.

c. Must be made of two pieces, a backing and capping, so constructed as to thoroughly encase the wire and maintain a distance of one-half inch between conductors of opposite polarity and afford suitable protection from abrasion.

Moulding is simply a protection against mechanical injury and in damp places may be even worse than nothing about the wire, since an air-space is an insulator while wet wood is a fair conductor. In dry places, however, it guards against mechanical injury to the insulating covering of the wire, and is a sufficient insulator. Saturating the moulding with a substance that will prevent the absorption of moisture guards against the danger of leakage in case of accidental conditions. The moulding is of course an additional danger in case of overheated wires, and while its use is allowed in a limited way it is not thought to afford first-class construction.

21. Special Wiring:—

In breweries, packing-houses, stables, dye-houses, paper and pulp mills, or other buildings specially liable to moisture or acid, or other fumes liable to injure the wires or insulation, except where used for pendants, conductors —

a. Must be separated at least six inches.

b. Must be provided with an *approved* waterproof covering.

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[Section *b*. The insulating covering of the wire to be *approved* under this section must be solid, at least three-sixty-fourths of an inch in thickness and covered with a substantial braid. It must not readily carry fire, must show an insulating resistance of one megohm per mile after two weeks' submersion in water at 70 degrees Fahrenheit, and three days' submersion in lime-water, with a current of 550 volts after three minutes' electrification, and must *also* withstand a satisfactory test against such chemical compounds or mixtures as it will be liable to be subjected to in the risk under consideration.]

c. Must be carefully put up.

d. Must be supported by glass or porcelain insulators. No switches or fusible cut-outs will be allowed where exposed to inflammable gases or dust, or to flyings of combustible material.

e. Must be protected when passing through floors, walls, partitions, timbers, etc., by waterproof, non-combustible, insulating tubes, such as glass or porcelain.

The requirements stated under Section 21 are, it will be noticed, simply more exacting than those for work subject to ordinary conditions. Rule 21 (*d*) meets a special condition that sometimes exists, and is made necessary because the action of switches and the melting of fuses cause an arc of short duration that might ignite gases or finely divided dust. The wire in these special places must stand a more severe test and the list of approved wires given under Rule 10 (*a*) is not necessarily correct for all these special conditions.

RUSSELL ROBB.

(To be continued.)

DELPHI.

FROM time to time during the past three years the *Builder* has drawn attention to the progress of the French excavations at Delphi, but for any more systematic account it has been necessary to wait for two things — first, the issue of a plan of the excavations; and, second, the opportunity for visiting Delphi in person and studying on the spot the topography of the site, the ground-plans of temples, treasures and votive offerings, and the sculptured and architectural monuments now stored in the local museum. It was our exceptional good fortune to visit Delphi in company with the Director of the French School, M. Homolle, and to hear from his lips his views as to the date and interpretation of the various buildings he has discovered. These views have been in the main laid before the public abroad in various conferences held at the French School at Athens and elsewhere, and are in part also published in recent numbers of the *Bulletin de Correspondance Hellénique*,[1] so we violate no confidence in placing them at some length before our readers. That the nation which discovers should be the first to publish is the most elementary rule of archæological etiquette; we are unable, therefore, at present to offer any reproduction of the as yet unpublished photographs of the sculptures discovered.

To any one who visits Delphi the first impression is of loss, the inevitable loss of the picturesque; old Kastri, the village that used to poise so beautifully on the steep slope, is gone for ever to make way for a Decauville railway, the bareness of freshly upturned earth, and a few dismal-looking ground plans. But let him once set his foot upon the Sacred Way, and regret is lost in a new and keener interest.

We must strictly limit our account by the plan before us (drawn up by the engineer, M. Couvert, and follow the Sacred Way just so far as it takes us — no farther — *i. e.*, from the beginning where it enters the precinct at the right hand of the plan to the Treasury of the Athenians, the last building sketched in. The Temple of Apollo is not included; at the time we visited the excavations, though the ground-plan was substantially complete, the whole site was not quite cleared, so it must wait a future occasion for discussion. Our method will be — Pausanias in hand — to follow just this small section of the Sacred Way, and see how far we can compare, how far supplement his account.

Pausanias (x., 9 ff.) approaches Delphi from Daulis, and therefore enters the precinct from the east. At the entrance (ἐσελθόντι δὲ ἐς τὸ τέμενος) stood, he says, a brazen bull by Theopropos of Ægina, the offering of the people of Corcyra. The bull, by his bellowing, had brought a herdsman down to the sea, and showed him a large shoal of tunny-fish. The pious bull wrought for his own destruction, for the fish could not be caught till he was sacrificed to Poseidon. From the proceeds of the catch the people of Cocyra dedicated his brazen effigy. The basis of this votive offering has been found *in situ*, but about a hundred metres higher up the Sacred Way, so that this gives us no topographical fixed point.

[1] It may be well at this point to indicate the literature, already considerable, that has grown up round the Delphi excavations, and to which the writer of this article owes much. First in importance come the official reports issued by M. Homolle himself in the *Bulletin de Correspondance Hellénique*, the organ of the Ecole Français at Athens. From the bulletin is taken the plan reproduced here. Two articles of a more popular character by M. Homolle have appeared in the *Gazette des Beaux Arts*, 1895, for February and March, and one somewhat more technical in the *Académie des Inscriptions et Belles Lettres Séance*, November 16, 1894. At a *conférence* at the French School on March 6, M. Homolle gave an address on the results of the excavations collectively, and, on March 20, he discussed the sculptures of the Siphnian Treasury. Of this last address a summary appeared in the *Berliner Philologische Wochenschrift*, April 27. In the same periodical Dr. Furtwängler, 1894, p. 1,276, and Dr. Belger, 1894, p. 863, have given their personal impressions. Last, but not least, we owe much to Dr. Pomtow's discussion of the relation of the discoveries to the narrative of Pausanias, in a paper read before the Berlin *Archiologische Gesellschaft*, and reported in the *Anzeiger*, 1895, vol. x, Heft i, p. 2.

Any uncertainty, however, as to where Pausanias stands shortly and decisively disappears. Conspicuous in the plan N and S of the Sacred Way, close to the entrance, are two large semicircular structures, marked respectively "Offering of the Argives, Kings of Argos" and "Offering of the Argives, the Epigoni." The southern of these two semicircles was in part laid bare by M. Pomtow in May, 1887; the northern one was brought to light in May, 1894. Its substructure lies about a metre above the pavement of the Sacred Way; a substantial wall of large blocks of stone closes it round to the north. At the foot of this enclosing wall is a low semicircular step, bearing inscriptions. From right to left run the names of Kings of Argos Ἄβας Ακρίσιος Δυγκεὺς Περσεὺς Ἡρακλῆς, and in the ordinary direction, left to right, the name of the artist, Antiphanes of Argos. The difference in direction is no doubt due to the desire to give to the names of these ancient kings a venerable air. This monument M. Homolle believes to have been that seen and described by Pausanias (x. 10, 5). It was dedicated by the Argives who helped Epaminondas and the Thebans in the foundation of Messene. "On it were represented statues of heroes, and the succession of kings that traced their descent to Herakles, or, even further back, to Perseus." It is this row of kings' names that have come to light.

Opposite these statues (καταντικρὺ) stood, according to Pausanias, another group — *i. e.*, the statues of the "Epigoni," also erected by the Argives — and these must certainly have occupied the southern semicircle discovered by M. Pomtow. The importance of this conjoint attribution cannot be overestimated. It gives an absolutely fixed topographical point, and enables us to place with almost equal certainty a whole series of other monuments on either side of the way. To get this fixed starting-point we have gone on a little in advance, and must retrace a few steps to the monument marked "Offering of the Lacedemonians." Here no inscription helps us, but the size of the monument, a chamber 25 metres long (not fully drawn in on the plan), and the fact that its east end all but touches the precinct wall, points to two conclusions: the monument contained must have been of extensive size, and must have been seen by Pausanias immediately on entering the precinct. Only one monument fulfils these two conditions, *i. e.*, the pompous trophy of Lysander commemorating his victory over the Athenians at Ægospotamos. It consisted of no less than thirty-seven single statues by various sculptors, nine ranged in front, including Lysander himself crowned by Poseidon, behind them eleven statues of Spartans and their allies who fought at the battle, then another seven (ἑφεξῆς) and yet another ten close at hand (ἐχόμενοι αὐτῶν). The general disposition of the chamber corresponds to this account. It opens on to the Sacred Way, and contains a large raised basis which appears to have been divided into several steps.

Opposite this Lysander monument again (καταντικρὺ), Pausanias saw a monument of Arcadian kings and heroes offered by the people of Tegea from the spoils of the Lacedemonians (369 B. C.); this was again the conjoint work of several artists, among them the Argive Antiphanes. Of this monument the basis, with inscription, was found by M. Pomtow in 1887; it lay just inside the temenos entrance to the south side of the Sacred Way, and consists of a block of black calcareous stone, 1.30 metres broad. There are three inscriptions on the stone, but two are later additions, the one in letters of the fourth century B. C., and consisting of five distychs, is the dedicatory inscription proper. It is fully discussed by its discoverer in the *Mittheilungen* (xiv, p. 15). It seems probable that, as in the case of the Argive kings, the names of the persons represented in the statues were inscribed, and that Pausanias took his account rather from these inscriptions than from the dedication on the basis, which is cut in very small characters. The Arcadian monument, as not found *in situ*, is, of course, not marked on the plan, but it may safely be placed on the south side of the Sacred Way, immediately opposite the Offering of the Lacedæmonians. Since this last, as mentioned above, all but touches on the precinct wall, all other monuments seen by Pausanias before he came to the Epigoni must stand on the south side. There are (1) the bull of Theopropos; (2) the "wooden horse" of the Argives; (3) the Marathon trophy; (4) the "Argive" trophy after the battle of Oinœ; (5) the chariot of Amphiaraos.

Here we may pause for a moment to make a reflection in honor of Pausanias. Frequent efforts have been made to disparage his authority as an eye-witness — to make of him a mere compiler, and, in the matter of Delphi, mainly depending on Polemon. Walking along the Sacred Way marking how his adverbs and prepositions fit in on the spot, it is impossible for any sane person to doubt that he actually saw what he describes. Dr. Pomtow, who has done so much for the topography of Delphi, is the first to own this. Another valuable result is that the precise meaning of particular expressions in frequent use by Pausanias comes out with more certainty here than in any other part of his perambulations. It is a relief to know once and for all that here, and consequently on the Acropolis at Athens, καταντικρύ means not merely opposite, but, when there is a road in question, *on the other side*; that ἑφεξῆς and παρὰ imply *immediate* consecution on the same side; and πλησίον and ἐγγὺς somewhat less immediate neighborhood, but still on the same side. When a new sentence is begun without indication of connection, it frequently, as Dr. Pomtow observes, indicates transition to the opposite side.

After the statues of the Epigoni the southern side of the Sacred Way is completely destroyed — on the north side its course can be clearly made out by various chambers, fragmentary walls and niches,

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but these are all of uncertain attribution. About 20 metres west of the Epigoni we come to a substantial fixed point, *i. e.*, the *Treasury of Sicyonians.* Pausanias passes the building by, merely remarking that neither in this nor any of the Treasuries were there any 'χρήματα' to be seen in his days. The excavations tell us more. Somewhat below the level of the Sacred Way the foundations in tufa were discovered of a building with the form, the usual form for Treasuries, of a *templum in antis.* The substructure of the building rests at a great depth on solid rock, and consist of fragments of some older building, pieces of the architrave, drums of Doric columns, and remains of some circular buildings; on these are certain stone-masons' marks similar to that found in the foundations of the Theban Treasury, to be noted later. As this building is the first that occurs of the shape fitting to a Treasury, and as the Treasury of the Sicyonians is the first named by Pausanias, there can be little, if any, doubt that the attribution is correct. In and about the foundations were found a number of metope sculptures in tufa, dating evidently about the sixth century B. C. The sculptures themselves are all painted mainly in red and black, the ground has at least preserved no trace of color, the pose of the figures, the rigid gestures and stiff drapery all recall the manner of the black-figured vase-painters; so do the inscriptions that accompany the figures. M. Homolle states candidly that the inscriptions do not present the characteristic forms of the Sicyonian alphabet (*e. g.* Χ = Ε), nor are the myths represented in any way peculiar to or characteristic of Sicyon. Moreover the metopes are a little large and heavy for the proportions of the building, nevertheless, from the condition in which they were found it is impossible to entertain the supposition that they belonged to a previous building and were used up as old material. The subjects are as follow: — 1. Idas and the Dioscuri bringing from Messenia the drove of captured oxen. The names are painted in black at the sides of the figures. Very curious, and decoratively very successful, is the pattern made of the manifold oxen legs. 2. A boar, probably part of a representation of the hunt of the Calydonian boar in which the Dioscuri took part. 3. Two horsemen seen *en face*, behind them a ship with warriors, of whom nothing remains but their bucklers, in the centre two figures playing on the lyre, near one of them the letters Φ Α Σ. The two horsemen are probably again the Dioscuri, and the scene may be taken from the voyage of the Argonauts. 4. A ram carrying a figure which must be Helle. 5. Curious and very archaic representation of Europa on the bull; she has the oddly compressed waist that appears on early black-figured vases, and she bends forward in an exaggerated pose.

Pausanias mentions the Treasury of the Sicyonians immediately after, a votive offering of the Tarantines, consisting of a group of horses and captive Messapian women by the Argive sculptor Ageladas; the Sicyonian was near this (πλήσιον) so we must place the Tarentine group immediately west of the Treasury.

After the Treasury of the Sicyonians, and standing near to it (παρά) Pausanias mentions a group of statues dedicated by the Cnidians; they represented Triopas, the founder of Cnidos, standing near his horse, and Leto, with Apollo and Artemis shooting at Tityos, who is represented (as usually on vases) as wounded. These are the only monuments Pausanias mentions between the Treasury of the Sicyonians and that next in order, the Treasury of the Siphnians, so we must place them somewhere in the intervening space.

A few paces farther to the west we reach the Treasury of the Siphnians. Herodotos tells us (iii., 57) that, about the time of the war against Polycrates, the affairs of the Siphnians were in a flourishing condition; "they were the richest of all the islanders, having in the island gold and silver mines, so that from the tenth of the money accruing from thence a Treasury was set up, equal to the richest." Pausanias, who saw the Treasury next after that of the Sicyonians, adds the further detail that the Treasury was built by order of the Delphic god, and that when in their greed the Siphnians neglected to send the annual tithe, the sea encroached and swept away their mines (P. x., 11, 2). The Siphnian Treasury stands impressively on a sort of rampart at the angle where the Sacred Way turns for the first time. It has the form of a temple with portico, and faces west, the only direction in which it is accessible. All round the Treasury were found not only the frieze, and pediment sculptures to be noted shortly, but a number of architectural fragments amply sufficient to show that the decoration of the building was rich and delicate to no ordinary degree. The whole scheme can be reconstructed. The entire architrave was of Parian marble; above the sculptured frieze came a line of beading, massive and archaic in character; above this a Lesbian cyma, of which many fragments are preserved. The cornice is richly decorated with a band of palmetta and lotus in relief, elaborately colored, the color still remaining with extraordinary freshness. Dr. Furtwängler draws attention to the fact that the decorative forms of these architectural fragments find their closest analogy in vases, not of Attic, Rhodian, or Chalcidian provenance, but rather in the hydriæ of Cære, which are acknowledged to be Ionian in style. Such forms appear to have been very popular at Delphi. The cornice was further ornamented, though probably on the front façade only, with bossed phialæ, the oldest examples of this popular form of decoration.

A building so elaborate and splendid would have been incomplete without sculptured adornment. Happily the frieze and the sculptures of one pediment have been found substantially complete; the sculptures of the west pediment are, however, entirely missing. They must have once existed, as the west is the principal façade and only entrance. By a most fortunate circumstance the sculptures of the frieze were found substantially where they originally fell, lying on all four sides of the temple, the corner slabs for the most part near the actual angles of the Treasury, so that the arrangement of the whole composition was a work of no very serious difficulty. The total length of the frieze was 28 metres, of which 20 have been found.

To discuss the details of the Siphnian Treasury without illustrations would be an unprofitable task, but a few words on subject and style may be allowed. And first it is noticeable that the technique of the pediment sculptures is distinctly more archaic than that of the frieze. The scene represented is the "Theft of the Tripod." Athene stands in the centre, and — as on a Chalcidian vase with the same subject — holds apart the two combatants, Apollo and Herakles. Behind Apollo are two women figures, Leto and Artemis; behind Herakles also two figures and his chariot. The arrangement is instructive for the history of pediment composition. The figures stand — as Dr. Furtwängler has well remarked, ranged like "organ-pipes," shortening towards either end; the actual angles were more than the artist could cope with, he leaves them unfilled — in fact, the composition is nothing but a bit of frieze cramped into a pediment. The central figures present a peculiarity of technique; the upper parts are worked fully in the round, the lower simply treated as relief. M. Homolle explains this as intended to throw the upper parts into prominence, in order to counterbalance the shadow cast by the tympanum.

When the pediment sculptures are examined side by side with those of the frieze, as they stand in the museum at Delphi, the greater freedom and livelier motion of the frieze sculptures is at once evident. M. Homolle goes further. He sees in the frieze itself the work of the two different artists — the slabs of the south and west sides from the older, those of the north and east to the younger hand. It is certainly noticeable that on the south and west slabs the relief shows but little modelling; like those of the pediment, the edges are cut square as in the well-known Sparta grave reliefs; on the north and east slabs they are more rounded. The composition, too, of these presumably later slabs is more complex.

From the point-of-view of subject, the whole frieze is a mine of mythological interest, and its value is the greater from the fact that nearly all the figures bear legible inscriptions — legible, *i. e.*, when they were first excavated, with letters painted red, some of which were written on the ground of the relief close to the figures, others on the band below the composition, as in the Pergamene altar. Originally, in all probability, every figure, and even the horses and some inanimate objects, had their names inscribed. Many of the inscriptions have disappeared altogether, some are now illegible, but sufficient have been clearly made out to place the subjects and most of the individual figures beyond dispute.

It was hoped at first that these inscriptions might settle the question of the school to which the sculptures belonged. This hope was doomed to disappointment, for inscriptions with letters of just the same form are found on the frieze of Sicyonian treasury, and on the metopes from the treasury of the Athenians. M. Homolle now holds that the inscriptions were painted in at Delphi after the sculptures were set up, and this would explain the uniformity in the alphabet. They are, however, none the less valuable as a clue to the subjects.

These fall into four groups, corresponding roughly to the four sides of the building. On the front (west) façade we have the apotheosis of Herakles. The central slab is unfortunately lost. It may have contained an assembly of the gods. The angles are filled by two chariots turned cornerwards. Athene stands near one of these in the act, apparently, of inviting Herakles to mount the chariot. The horses are winged, and one of them is inscribed "Pegasos." Hebe (inscribed) stands near the other chariot. Near her Niké (inscribed) and a third figure.

Less certain is the position of the next important group, representing the preparations for the chariot-race between the Pelops and Oinomaos. A fragment from this portion of the frieze, containing a chariot, was found long ago. All the important male figures are inscribed, *i. e.*, Pelops, Oinomaos, and Myrtilus, and between the chariots is an altar incribed as "Altar of Zeus." This detail is of special interest in relation to Dr. Dörpfeld's conjecture that in front of the figure of Zeus in the Olympian pediment an altar may have stood. An altar gives point and emphasis to the scene, and occurs in vase-paintings wherever the contest is represented. The east side contains an Homeric contest over a fallen warrior, inscribed Sarpedon. Menelaos also is inscribed, and Patroklos is evident from the fact that on his shield is written "of Achilles" ('Αχιλλέως). He is carrying the arms of his friend. The combat is watched by a number of gods on either side, as their sympathies are Trojan or Greek. Some are easily recognizable from their attributes — others, *e. g.*, Nemesis must, but for these inscriptions, have remained uncertain. On the bosom of Zeus a hand rests, apparently of a suppliant; the figure is lost, but on the band below is inscribed Θέτις Αχιλλέως μήτηρ. The seated gods are like some early prototype of the seated gods of the Parthenon, and the resemblance naturally struck the discoverers at first sight, but these archaic divinities are much livelier and keener in gesture; they have not yet attained the well-bred composure of the Parthenon Olympians.

On the north side, that facing the Sacred Way, a gigantomachia is depicted, and from this composition come some of the finest motives in the whole frieze. Fortunately here, too, inscriptions abound, and it is hoped some incidental light may be thrown on the still problematic

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figures of the Pergamene altar. Athene and Enkelados, Cybele and her lions, Dionysos with his kantharos helmet, Herackles with his lionskin, need no inscriptions. One group, but that it is inscribed, might well have baffled interpretation. A bearded man, wearing a short chiton, stands close to a large pithos, over it seems to place his open hand; with the other hand he is apparently closing a sort of leathern bag. An inscription tells us that he is Æolus, who appears here, for the first time we believe, in Archaic sculpture. The pithos is probably the main store-house of the wind, from which, from time to time, the bag is filled as wanted. In the Odyssey (x., i.) we have no mention of a pithos, but Odysseus says "he gave me a wallet made of the hide of an ox nine seasons old, which he let flay, and therein he bound the ways of all the noisy winds." The pithos may stand as shorthand for the island "surrounded by the wall of bronze unbroken."

About the question as to what school gave birth to these curious and sometimes beautiful Siphnian sculptures, controversy has already commenced. We have no evidence that a school of sculpture ever existed on the island itself. Herodotus tells us that the Siphnians possessed a market and a prytaneion of Parian marble, and the frieze is of that material. The architectural decorations of the building are archaic Ionian, but the style of the sculptures is not wholly what we associate with Asia Minor. Dr. Furtwängler does not hesitate to attribute the Siphnian sculptures to a Parian artist. M. Homolle inclines to see in them Argive influence, and he rests his argument, in part, on the evidence of epigraphy. On the shield of one of the giants an inscription occurs with the Argive lambda. The heavy proportions of the figures seem to point to Peloponnesian tradition, the choice of subjects, *e. g.*, the contest of Pelops and Oinomaos; and the prominence given to Menelaos may look the same way, but the question must await the full publication of the sculptures.

Immediately after the Treasury of the Siphnians Pausanias mentions statues set up by the inhabitants of Lipara after a naval victory over the Tyrrhenians. The site of these is not marked on the plan, but just at this spot an inscription has been found belonging to a votive offering from Lipara (*Bull. de Cor.*, c. xvii., p. 614).

So far the Sacred Way has run steadily at a moderate incline in a direction almost due west. It now turns at right-angles to the north, and climbs upward by a series of steep steps for about 13 metres, and there meets the elevated terrace of the Treasury of the Athenians, our present goal. Just opposite where the road turns, and on its left side, we come to another building, the Treasury of the Bœotians.

At this point Pausanias becomes topographically somewhat vague. Immediately after the Lipara monument he says, but with no topographical indication, that "the Theban Treasuries resulted from the victory of Leuctra as the Athenian from the battle of Marathon." He then goes on to mention the Treasuries of Syracuse and Potidaia, and the circumstances of their founding; these two last have not, so far, come to light. Fortunately, as to the Bœotian Treasury there is no doubt. A number of blocks were found covered with inscriptions, some dealing with the whole people of Bœotia, others with individual Thebans, also a decree about a boundary between two Bœotian towns. It is true these blocks were found not *in situ*, but a good deal farther down, south of the wall marked "Helleniko" in the garden of a modern house, but M. Homolle has no doubt that they belong to this spot. The Treasury of the Bœotians is built of bluish limestone in the form of a Doric temple. It stands on a foundation of tufa blocks, which, like those of the Sikynonian Treasury, seem to have come from another earlier building, and, to judge from the mason's marks, of the same date. The whole building has suffered much, and though its ground-plan can be made out, only the remains of the south side are now actually *in situ*.

The last of the Treasuries to which we came is perhaps first in importance, *i. e.*, the Treasury of the Athenians. Its claim to special attention is a double one. In the first place, its date is secure; we know, both from literary tradition and the evidence of inscriptions, that it was built to commemorate the battle of Marathon. Its sculptures and its architecture, therefore, furnish a fixed point, a standard by which we may help to date other monuments whose chronology has so far been problematic. Secondly, both the architecture and the sculptural decorations are of a fineness and finish of execution so far unique. The architecture of the building can be completely restored, and many of the metopes are marvellously well preserved. With the exception of the lowest step, which is of the reddish calcarean stone employed in the Anthenian Stoa, the whole building is of Parian marble, the metopes of a fine quality, the triglyphs of a bluish, somewhat coarser, stone. The sculptures of this Treasury are, for the present, kept apart in a basement room of the temporary house where the French excavators live. At the first glance we feel as though we were looking at a series of Theseus and Herakles vases of the finest period directly rendered into marble; the same types, the same careful, delicate detail. One façade was devoted to the labors of Theseus, six in number, the other to those of Herakles. The sides were decorated with combats of Amazons, a Geryoneia, and possibly a Gigantomachia, but these are less well preserved and at present of uncertain disposition. One of the best of the series is a bending figure of Herakles with lion skin knotted about his neck; in the field are his bow and arrows with a piece of drapery, figured exactly as these recur again and again on red-figured vases, a bull and an Athene and Theseus standing opposite each other, the hero apparently awaiting the orders of the goddess. The contests with Periphetes, Sinis, Kerkyon, and the Minotaur have also been made out. Of the pediment sculptures nothing so far has been discovered. Two figures in the round of mounted horsemen and Amazons which at first were believed to belong to the pediments are now attributed to akroteria. Some twenty or thirty years later than the Siphnian sculpture, and of much greater delicacy and finish, the metopes of the Treasury have still a slight savor of archaism about them. As to closer relations with other known sculptures it may be better to await the full publication of the metopes.

On the north side of the Sacred Way, exactly at the corner where it turns sharply north, a quadrangular building is marked on the plan, to which M. Homolle gives no name. He conjectures that it may be the Bouleuterion. M. Pomtow, on the other hand, would see in it the Treasury of the Cnidians, which Pausanias mentions in one breath with, and must have seen at the same moment as, the Treasuries of the Bœotians and the Athenians. Further excavations may settle this question, and may also yield to us the Treasury of Potidaia.

We have reached our goal with the Treasury of the Athenians; the plan for the present extends no further. After this last Treasury the road branches out into side ways east and west, and topography is likely to become more complex. With the issue of the next section of the plan we hope to continue our account. To describe the further monuments we saw on the spot without a plan would only be confusing. The great centre of interest — and, we may add, of disappointment, for not a fragment of its sculptures has come to light — the Temple of Apollo, still remains for discussion. We only add that close to its foundations have been found not only new fragments of the famous musical hymn, but also a beautiful statue of Antinous, one of the finest sculptured monuments that the excavations have yielded. How much yet remains unexplored is best realized by reading ahead in the account of Pausanias.

One lesser matter we hope will not escape attention, *i. e.*, the complete exploration of the Fountain of Castalia, at which every traveller stops to drink. There, as Dr. Dörpfeld pointed out on the spot, clear indications still remain that an extensive well-house once existed, analogous in its general plan and arrangement to the Enneakronnos of Peisistratos that he claims to have re-found for us at Athens.

Archæologists from all Europe met this spring to do honor to the excavators of Olympia; we may hope that before another year is past a like tribute will be paid at Delphi. — *The Builder.*

BOSTON PUBLIC LIBRARY.

IT is interesting to discover how fruitful and seemingly inexhaustible a topic for newspaper discussion is the new library building in Boston and with what astuteness writers seize upon little points as a text for conveying interesting, if not particularly useful, information. For instance, some one points out that a gross piece of archæological illiteracy has been manifested by placing upon the head of Pallas, that forms the ornamental keystone of the arch over the middle one of the three eastern doorways, the helmet that belongs to the warlike Latin Minerva, whereas the headpiece of the Grecian goddess of wisdom — proper *custos* of libraries — should be ornamented with figures of centaurs and sphinxes.

Quite in keeping with this was the copious flood of mythological lore that was poured out when it was made known that Mr. McKim had presented to the Library the graceful but nude figure of a bacchante by MacMonnies, which eventually will make the court-yard one of the most frequented spots about the building. The vigor of the attack by those of prudish inclinations and the citations they made from classic authorities was only equalled by the quickness with which the defenders discovered other citations and upheld the modesty and virtue of the priestesses of Bacchus. In this case, as in that of the *putti* on the front of the building, we, while not sharing in any way the prejudice against the nude in art, feel that since there are very many respectable people who prefer that their art works should present the skill of the human tailor rather than that of the Creator, it is a mistake in the case of a public building to please one portion of the public at the expense of another.

From one point-of-view we are very glad that the "Bacchante" is to find a place at the Library, since it will show that MacMonnies is capable of doing better work than is represented by the sketchy and theatrical figure of Sir Harry Vane, which at present stands somewhat disconsolately in an upper room of the special library floor and is apparently wondering why any one ever thought of placing his bulk indoors.

It is plain that the sculptured attributes that are already being prepared for the building are to be worthy of it and of the mural decoration already in place. It seems, however, somewhat regrettable that Mr. French is to expend his efforts on bronze doors rather than upon something less elusive and illusory. The labor and skill consumed in producing bronze doors is in large measure waste effort, since to be appreciated bronze doors need to be closed, and a library with closed doors is hardly a profitable institution. As the doorways are hardly wide enough to allow the construction of a *guichet* in one valve of each door, these bronze doors of French's must, save on holidays, stand open, and his work must be seen imperfectly by the aid of internal or reflected light without the aid and accent of direct cast shadows. Moreover, people who wish to examine his work at their leisure can only do so under penalty of becoming nuisances through forming obstructions to free and unobstructed

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passage through the doorways — and the chief use of doorways is to afford such passage and not to constitute an art gallery.

It is a great satisfaction to know that private enthusiasm and generosity has come to the aid of Art and has raised the $15,000 needful to enable Mr. Sargent to complete his decoration of the upper staircase hall in fulfilment of his original scheme. It was so obvious that the money must be raised, that there is no particular reason for gratulation that the sum has been secured, but it must be a satisfaction to Mr. Sargent and all others interested, that it was secured with such ease and that so many individuals wished to contribute to it.



CONTRACT *vs.* DAY-LABOR.— THE CHIGNECTO SHIP-RAILWAY. — PROBABLE ABANDONMENT OF THE MONTREAL WORLD'S FAIR. — MINERAL DEVELOPMENT. — LOW-LEVEL WATER IN LAKE ONTARIO. — THE TORONTO WATER-SUPPLY.

THE question as to whether day-labor or contract is the more economical appears to have received a very decided answer in the experiences of the Canadian Federal Government. The point is being continually brought up in municipal councils, but in such cases, it is to be feared, the arguments *pro* or *con* are usually propounded by those more or less biased one way or the other, and a clear candid opinion as to the merits or demerits of either system can hardly be expected from city aldermen. The opinion of Parliamentary committees ought to be worth more: at any rate, both systems have been given fair trials in the last few years here, and the results are eminently in favor of contracts. The case of the Lachine bridges, which was recounted in the last Canadian letter, proved conclusively how easily the country may be defrauded, and up to almost any amount, by unscrupulous contractors. A legal precedent for the construction of the Lachine bridges was set some years ago by the plan pursued in the case of the Fort Francis locks. This costly and magnificent work was carried out by the Government, under its own inspectors, without contract, and the results were not satisfactory; but it was thought that in a city like Montreal, where labor was plentiful and wages moderate, better results must be obtained. However, as was shown in the former letter, the Government was doomed to bitter disappointment which was only aggravated by the police magistrate, Judge Desnoyers, refusing to commit the contractor for trial, although the evidence seemed clear enough as to the alleged frauds, but not, in his opinion, sufficient to warrant committal. The matter, however, is not at an end yet. Although the Government has failed in the criminal prosecution, a case for the return of overpayments is to be proceeded with. The country will hardly care to see any more of its great works carried out by day-labor. The experiment of the Toronto Council in having its new municipal buildings finished by day-labor is being watched with interest. This building was begun under contract, but only reached some twenty feet above the ground level, when the contractor was dismissed. Owing to certain difficulties in obtaining satisfactory tenders for the completion of the works, it was decided to proceed with them by day-labor.

Mr. Provand, M. P. for the Blackfriars Division of Glasgow, the managing director of the Chignecto Marine Railway Company, has been in Canada interviewing the Government, and requesting for this Company an extension of time for completion of the works at Chignecto by two years. About three and a half millions have been already expended on the works, and about a million and a half more are required. The amount has been subscribed by shareholders, and it is claimed that the work could be completed in the time asked for. The Canadian Government guaranteed a subsidy of $170,000 a year, for twenty years after the completion of the works, the period of construction being limited in the Charter granted to the Company. Mr. Provand stated that it was through no fault of the Company that the work was not completed within the time specified. It was the fault of the contractor, who was largely interested in contracts in the Argentine Republic at the time of the suspension of Baring Bros., which caused his failure and the stoppage of the works. The engineer of the Company, together with Mr. Provand, visited Canada last year, with the same object in view, and interviewed the premier, the late Sir John Thompson, but, so far as is known, did not obtain any definite promise from him. Whether Mr. Provand has been successful this time or not is still uncertain, but a contention has arisen over the interpretation of the expression "efficient working" of the railway, which occurs in the agreement referring to the granting of the subsidy. The Company interprets the words to mean simply having the railway completed and ready for traffic. The other interpretation is that the road should be actually handling a reasonable amount of traffic, and it is said that if the Company desires the extension of time, it will have to show that it is carrying a minimum amount of traffic, which is put down at a million tons of shipping, annually. Mr. Provand has, in the meantime, gone home, and it is possible some time will elapse before anything is settled.

The Montreal World's Fair promoters have received a disheartening blow from the Dominion Government, which is unable to comply with the request of a deputation for the grant of a quarter million of dollars towards their project. Retrenchment being the order of the day, an undertaking, not an absolute necessity to the country, would not be likely to receive a grant at this time. It is probable that an "Exhibition" will be held, but only on a small scale, and it will be only of a provincial character.

The annual statistical table of the mineral production of the Dominion has recently been issued by the Geological Survey Department, and contains particulars of the entire production of Canadian mines for the year 1894. The document is exceedingly interesting, as showing the progress made in the increased mineral output of every kind. Nine years ago the total value of the mineral output was twelve million dollars, while last year it reached within one hundred thousand of twenty million dollars. These figures will appear small in the eyes of those accustomed to the returns of well-developed mineral districts, but it must be remembered that mining in Canada is comparatively a new thing, and although rich in almost every mineral deposit, little has yet been done in the way of development. Hitherto, our vast mineral resources have been somewhat mystical to the outsider, but, by a gradual process, we are proving that our underground riches are not an empty boast. With a population of only five million in so vast a territory, the lack of necessary capital is not surprising, but the confidence of outside capitalists is annually increasing, and each year we may expect to see great strides made in mineral development. In the important matter of gold mining, we got very near the million mark, the actual value being $954,451; of nickel the value raised was $2,061,120, and of silver $409,239; copper stands at $805,760, and iron ore at $226,611, of which 108,871 tons were converted into pig-iron, producing pigs valued at the furnaces at $646,447. The total metallic output is given as valued at $4,683,389. The non-metallic products, which foot up to nearly sixteen millions of dollars, include bricks, building-stone, petroleum, gypsum, mica and a great variety of other materials.

The inhabitants on the shores of Lake Ontario are all asking "What has become of the water?" or "Where is the water going to?" for despite all the snow of last winter and the usual amount of spring rain, the level of the water has been getting lower and lower and is now some two feet lower than last spring. The snow and rain seemed to have no effect upon it. Scientists have tried to explain that high levels and low levels of the Lakes run in cycles, but that does not convey much comfort to the citizens of Toronto who find their water-supply in danger of being decreased. They have just refused, by a large majority, to permit the City Council to expend a big sum in the carrying out of its engineer's programme of constructing a tunnel under the bay and through the island that separates Toronto from the Lake. Not that the tunnel could be constructed and the supply made sure in time to save them from the calamity they think they see before them this year, but who can say what trick the water of the Lake may play another season. The Council had ideas of its own, and in its wisdom saw fit to couple some unpopular suggestions of expenditure with the item for the water-works, thinking that the latter was sure to pass and would drag the other through with it. The tunnel by-law, however, did not pass. It was proposed to put in new mains on the principal streets of the city; to improve the fire-pressure at a cost of $226,000; a new steel intake-pipe, to replace a portion of the present supply-pipe which runs through the island and is of wood, to cost $75,000; and the tunnel across the bay, at the price of $450,000: total, $751,000. To quiet-minded people, like the inhabitants of Toronto, the amounts are alarming, but it is difficult to see how the ends required could be attained in any other way, and attained they must be. They have spent years in growling and tinkering at the supply-arrangements, thousands and thousands have been expended on ill-conceived and worse-executed schemes, but the Council has itself only to blame for the recent defeat of the great remedial measure. Some people seem to be satisfied with the fact that a great improvement has been made in the quality of the water supplied during the last two years, regardless of the cause, which was a result of repairing the present conduits, which in a few years *will* give out entirely and *may* at any moment require more repairs. In recounting the circumstance, it should be borne in mind that the electors entitled to vote on money by-laws only represent a small proportion of the water-drinking population, and that only four thousand out of nearly two hundred thousand actually voted.

At the time of closing this letter, news is received from Montreal that the case against St. Louis, referred to at the beginning, is at an end. The Grand Jury threw out the bill. Mr. St. Louis has been very much sympathized with by a large proportion of those who followed the cases against him, for although no doubt existed of wrongful proceedings — claims for work in excess of that executed and for time never occupied — yet it was equally clearly shown that Mr. St. Louis was not entirely responsible, and it was that that caused the Judge at the first inquiry to refuse to send the case down for trial. Moreover, the defendant has been forced to pay heavy sums in his own defence.

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ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

DOORWAY TO BATES HALL: PUBLIC LIBRARY OF THE CITY OF BOSTON. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print issued with International and Imperial Editions only.]

NEW BRANCH BANK OF MONTREAL, NOTRE DAME ST., MONTREAL, CAN. MR. ANDREW T. TAYLOR, F. R. I. B. A., R. C. A., (OF MESSRS. TAYLOR & GORDON), ARCHITECT, MONTREAL, P. Q.

OWING to the growth of the city it has been deemed expedient to establish branch banks in various parts of the city. The one represented has just been completed. The building is simple but picturesque, and is built of red Scotch sandstone. A large carved panel of the arms of the Bank fills the front gable. The ground story and basement are intended for banking purposes, the upper floors being for offices and caretaker's house. The banking-room is finished in old mahogany and antique brass with mosaic floor, and the ceiling and walls are somewhat elaborately decorated.

ST. MICHAEL OF CREECH ST. MICHAEL, NEAR TAUNTON, SOMERSETSHIRE, ENG. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

NAVE OF ST. CUTHBERT'S, WELLS, ENG. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

CHURCH AT DYNDER, ENG. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

SEE article elsewhere in this issue on "English Country Churches."

TERRACE OF HOUSES FOR EUGENE R. KNAPP, ESQ., BROOKLINE, MASS. MR. A. H. DODD, ARCHITECT, BOSTON, MASS.

TULIP HILL, 1750, WEST RIVER, MD.

[Additional Illustrations in the International Edition.]

PUBLIC LIBRARY OF THE CITY OF BOSTON. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

DETAIL OF STAIRCASE HALL OF THE SAME.

[Gelatine Print.]

VESTIBULE AND STAIRCASE ARCH OF THE SAME.

[Gelatine Print.]

SECONDARY SCHOOLS AND TECHNICAL INSTITUTE, RICHMOND, FOR THE SURREY COUNTY COUNCIL, ENG. MESSRS. FRYER & BATH, ARCHITECTS, WESTMINSTER AND RICHMOND, ENG.

WE illustrate the selected design submitted under motto "*Labor et Spes.*" Eleven sets of plans were sent in and adjudicated upon by the county surveyor. The selected plan was unanimously adopted by the Surrey County Council and the Richmond Technical Instruction Committee. The buildings will occupy a prominent site on the Kew Road at the corner of Selwyn Avenue. The plan provides for a large hall at the corner of Selwyn Avenue capable of accommodating 300 persons, behind which will be a class-room for dress-cutting, and provision for cookery classes, with a separate entrance for the women attending the classes; while a large corridor will separate this building from the hall, and so prevent any annoyance or disturbance to classes in the hall. This wing of the building, however, will not be erected at present, owing to lack of funds. The opposite wing will contain a class-room, 60′ x 25′, which will at present be used as a hall, and is divisible into three smaller rooms by means of movable partitions. In the main building on the ground-floor there will be two large class-rooms, several smaller rooms, and accommodation for the head master. Behind the large class-room will be a well-equipped chemical laboratory and balance-room. On the first floor is the art school, 40′ x 25′, with an art class-room adjoining and an art master's room attached. On the same floor are other class-rooms and the caretaker's apartments. There are large basements which will also be utilized. The building will be heated by hot-water radiators and boiler-room; ventilation will be specially provided for; and one of the best features in the plan is the admirable arrangement for lighting, especially in the art-rooms, where there are both windows and skylights.

Tenders have been invited for the erection of the buildings, the lowest being that of Mr. T. W. Brooking, of Richmond, for 6,868*l.*, which, with certain modifications, has been accepted by the Surrey County Council.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE COST OF BUILDINGS PER FOOT.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Some years ago I saw a very fine table in your paper giving the cost of different kinds of buildings both per square-foot of floor-space and by cubic contents of the building: the list had houses, stables, churches, business buildings, schools, etc. Will you please publish it again or one like it and greatly oblige, W. H. B.

[SHOULD we begin to republish the valuable and interesting papers that this journal has contained in the last twenty years, so many, overlooking the real usefulness of such a course, would be found willing to charge us with mere parsimony that it does not seem wise to comply with our correspondent's request. He will find tables relating to the cost of buildings in our issues for May 21, 1881; April 5, 1884; February 17, 1894; and April 7, 1894. EDS. AMERICAN ARCHITECT.]

THE ACTION OF IRON ON WOOD.

NEW ORLEANS, July 4, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — The remarks of Mr. Samuel Cabot, on the "Weathering of Nails" published in your paper of June 29, apply as well to a more important case, viz, the decaying of the feet of posts, etc., in contact with iron in damp places.

I have repeatedly found, where wooden posts stood on stone blocks, with a centre iron pin to keep them in place, that a large hole had rotted away from the pin, so large sometimes as to endanger the safety of the post.

This has induced me not only to avoid the use of iron pins in such places, but even to avoid using iron plates under posts in damp places; or if compelled to do so, to use tar or tarred felt or sheet copper between the two. Yours truly, JAMES FRERET.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

CHICAGO, ILL. — *Paintings by Manet:* at the Art Institute.

NEW YORK, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES & CLIPPINGS

LAST OF THE PHILADELPHIA CABLE-CARS. — A few days more will witness the ending of the cable-system as a means of passenger transportation in Philadelphia. Within a week every remaining cable-car on the Market Street main line, the last link in the cable system, will be displaced by the trolleys. The passing of the cable-cars marks a step in the progress of street-railway facilities in Philadelphia. When the system was introduced, it was looked upon as a solution of the problem of rapid transit, and on the strength of this opinion the Philadelphia Traction Company invested a fabulous sum, estimated to be in the neighborhood of $8,000,000, in equipping the Market Street, Columbia Avenue, and Seventh and Ninth Street lines. But while they were an improvement over the jogging horse-cars, they by no means proved satisfactory, and it is with no regret that the cable-system has followed the horse-car line in giving place to the trolleys. The cost of construction of the cable-lines was enormous in comparison with the equipment of the trolley lines, the cost of operation was greater, and the service rendered was less efficient. As a consequence, the cable-cars have been forced out of service by the system which has demonstrated its superiority. The machinery at the power-stations, now lying useless and idle, represented to the Traction Company an immense amount of money, and it would appear on the surface to be a sheer waste of hundreds of thousands of dollars to dispose of all the gigantic driving-gear for a mere song to be broken up for scrap-iron. Yet it is useless for any other purpose, and the Traction Company has disposed of it all to a scrap-iron firm for the best bargain it could obtain — the great winding-drums, around which the greased cables passed, and the heavy driving machinery, weighing thousands of tons, all of which are to be converted into iron and steel junk. Of all the machinery in the immense plants, the engines and boilers are alone valuable above the price of old iron. — *Philadelphia Record.*

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An Almshouse Inscription. — In front of some almshouses at Leominster, England, there is the quaint stone figure of a man holding a hatchet in his hand, and underneath there is this inscription: —

He who gives his money before he is dead
May take up a hatchet and cut off his head.

The story current in the neighborhood says that the founder of these almshouses came to want through being involved in building expenses for them, and actually had to seek refuge within their walls as one of the inmates. — *Exchange.*

The Pulpit in the Cathedral of Pisa. — *Archivio Storico dell' Arte*, which, for want of subscribers, threatened to founder, has reappeared triumphantly with the first number of a new series containing several interesting articles and documents. The most important contribution is one by Signor Supino, who, after a careful study of various descriptions dating from the fifteenth century, comes to the conclusion that Giovanni Pisano's pulpit in the Cathedral of Pisa originally was supported on eleven columns, and only one sculptured group. The remaining groups, which, if they formed part of this pulpit, would, in truth, make it grossly over-elaborated, Signor Supino ingeniously proves, on both documentary and stylistic grounds, to have belonged to the tomb of the Emperor Henry VII, begun in 1315 by Giovanni Pisano's pupil, Tino di Camaino, and to have been added to the pulpit during the rearrangement of the Cathedral and its monuments that took place at the end of the fifteenth century. — *Philadelphia Telegraph.*

Plan of Paris Exhibition. — It is decided, says our Paris correspondent, not in 1900 to cover the Seine with an iron bridge, extending from the Avenue Montaigne to the Place de la Concorde. The plan adopted is to turn the river into semblance of a grand canal at Venice. The principal entrance to the 1900 exhibition will be in the Cours la Reine, near the Place de la Concorde. The portal is to be flanked with two buildings devoted to education and technical instruction. The Fine Arts Palace will face the Esplanade of the Invalides and cover the Jardin de Paris. These buildings and a bridge over the Seine will be the only permanent constructions. The Venitian palaces on the river will be places of amusement. The bridge will take a slightly oblique course, and have but one arch, the span of which will be of steel. Between it and the Pont de l'Alma will stand the Palace of Flowers, and the Palace of Social Science and of Congresses. Foreign exhibitors will be given stands in pavilions and palaces in the Champ de Mars, where the agricultural show is also to be held. A Château d'Eau with cascades is to serve as vestibule to a Palace of Electricity bordering the Avenue de Suffren. — *London Daily News.*

Log Rafts on the Pacific Ocean. — Despite previous failures, Pacific coast lumbermen are still trying to raft logs in the Pacific Ocean. It is stated that a raft is now nearing completion at Stella, Wash., which will be started down the Columbia River *en route* to the sea about the middle of June, when the favorable weather, common to that period, is expected to permit the enterprise to terminate successfully. The raft will contain 400,000 lineal feet, or 6,000,000 feet board-measure. It will be 525 feet in length, 52 feet wide, 30 feet in depth, and will draw between 20 and 21 feet of water. The two previous experiments with log rafts, costing about $40,000, were failures, the rafts going to pieces before they had fairly cleared the mouth of the Columbia River, and their floating *débris* proved a menace to shipping, and, if the present experiment does not succeed, steps will probably be taken to prevent repetition. Could logs be rafted to mills down the coast it would be a great thing, but the chances are so great against the plan that it will probably never be a common method of log transportation on the Pacific coast. Similar attempts have been made on the Atlantic coast. Even the partial success of the second experiment at rafting logs on the coast of New Brunswick for transport to New York was not so marked as to induce lumbermen or capitalists to adopt the log raft as a common mode of transportation. — *Northeastern Lumberman.*

London's Pneumatic System. — Telegraphing over short distances — as within towns, for instance — is a very costly operation. It requires the same number of operators — one at each end — and the same number of instruments as for the longest distances. But compressed air will blow a telegraph-form through a metal tube as far as two or three miles in as many minutes; and steam engines are used to compress the air by means of which the pneumatic tubes are worked. The engine-room at the central office resembles nothing so much as the engine-room of a great steamship, except that the engines are on the "beam" principle, as being best suited to the peculiar work in which they are engaged. They are magnificent specimens of the engineer's craft, and have a stately appearance, due, in large measure, to their leisurely stroke as compared with the hurried action of the marine or electric-light engine. Night and day these engines are employed in pumping air into, or exhausting it out of, huge "containers," which are connected with the tube-room overhead. There are no fewer than thirty-six pneumatic tubes radiating throughout the metropolis, buried under the pavement among the gas and water pipes, and every now and then crossing the path of the telegraph wire, whose handmaids they are. It is desired, say, to send a message from St. Martin's-le-Grand to Charing Cross. Here is a tube-like felt-covered box which will contain one or a dozen message-forms at pleasure. Place the form inside; secure the open end of the box, or "carrier," as it is called, by means of an elastic band; insert the box in the mouth of the tube; admit the compressed air, and away it goes across Newgate Street, along Paternoster Row, down Ludgate Hill, up Fleet Street, and along the Strand, where, at No. 448, it projects itself under the nose of the attendant with a thud and a rebound, in almost shorter time than it takes to describe the operation. All the air is stored at the central office, so that if it be desired to reverse the operation — *i. e.*, to send a message from the West End to the City — it is only necessary to transmit an electric signal, when vacuum is turned on, and the "carrier" is sucked back which a minute before had been blown out. The tubes are, in fact, gigantic pea-shooters. What may be called the working-gear of the tubes is in itself a most interesting sight. It has been mostly designed by officials of the Telegraph Department, and is unique of its kind. Indeed, the whole pneumatic system of the central office is an "exhibit" of the most interesting kind, and an object of just pride with those who have it in charge. — *The Gentleman's Magazine.*

The Story of Mercie's "Gloria Victis." It is not generally known that the famous group, "Gloria Victis," by the French sculptor, Mercié, was inspired by the late M. Thiers. In November, 1870, Mercié occupied the place in the Villa Medici in Rome, which was made vacant by the death of the winner of the First Prize in sculpture. Like all French patriots, he was shocked and grieved beyond measure over the disasters of France. As an artist, too, he was hurt by the unexpected turn of affairs, because immediately after the declaration of war he began to make a statue of Victory to commemorate the triumphs of the French arms. Very soon the work became not only useless, but impossible. Mercié was in gloom and grief over what he considered the complete loss of his statue, when Thiers, in his tour through the capitals of Europe, in the effort to gather up a little sympathy for France, arrived one morning in Rome. Mercié obtained an interview with him, spoke of his defeated country and of his own future now forever compromised. Thiers, notwithstanding his graver preoccupations at that moment, still remained the friend of artists and the connoisseur that he always was. He promised to look at Mercié's work at the Villa Medici, and he kept the promise. In presence of the winged statue of Victory, which was made to symbolize the French triumphs that the artist had hoped for, Thiers stood in mute admiration; but when Mercié remarked, sadly, that one of two things only remained for him to do, either to destroy the figure or to hide it, he looked sternly at the sculptor and said, "Neither one nor the other. Glory does not belong to victory alone. Keep your statue, but, instead of having it holding up crowns and trophies, make it glorify the heroism of a dying soldier. Then it will not be a victory; it will stand for Gloria Victis!" "Ah!" cried Mercié with tears in his eyes, "May you save France as you have saved me!" — *Philadelphia Record.*

The Dangers from Using Incandescent Lamps. — A fire-insurance paper calls attention to the danger of fire from the incandescent-lamp globe in store windows, through the ignorance of the window-trimmer. Desirous of making as light and fluffy a display as possible, he winds loose and highly inflammable material around the butts of his lamps, and occasionally is bold enough to envelop the bulb itself with tarlatan, canton-flannel, cotton-lace, or similar light material. In notion houses, a celluloid comb is often placed where the light will show it off best to the outside spectator, regardless of the danger of ignition, or a semi-transparent sheet of like material will be adjusted close to a lamp, at the imminent risk of putting the whole window in a blaze. It should be clearly understood that incandescent lamps throw off sufficient heat to start fires under anything like favorable conditions. Not long ago a fire broke out in a Boston dry-goods store through an incandescent lamp being allowed to remain for a few moments on a pile of cotton cloth in the packing-room. The person in charge left the room for a short time, having, as he said, "the idea that the electric lamp couldn't set fire to anything," and when he returned the cloth was blazing. Another fire broke out while a window-dresser was preparing a Christmas snow scene. The incandescent lamps in the window had not been changed for a year, except when there had been breakages. The carbon in an incandescent globe has a life of 600 hours, and as the filament wears out increasingly more heat is thrown off upon the glass bulb, and even upon the metal fittings. The dresser was filling the floor of the window with loose cotton upon cheesecloth to represent snow. This was packed closely around the stems and globes of the electric lights, and the inflammable cotton, coming in contact with the burning-hot glass and metal, caused a fire. — *N. Y. Times.*

An Ingenious Method of raising Water. — "One of the most interesting and ingenious methods of raising water from a river I saw recently on a visit to Green River," said Assistant Engineer Gilcrest. "It was a contrivance arranged by Charles McPherson at that place. It consists of a wooden wheel two and a half feet in diameter, and armed with paddles, which were set in motion by the current of the river, into which it was placed between two old scows. At one point in the circumference of the wheel is an offset with an opening in it. As the wheel revolves, the water is forced through the opening into a coil of pipe in the body of the wheel, which is arranged like a snail's shell. This coil terminates in the axle of the wheel, which consists of a gas-pipe two and a half inches in diameter. A perpendicular standpipe rises from this axle five and a half feet above the centre of the wheel, and through this pipe the water is forced in a continuous stream. All of the work on the wheel is rough-and-ready, but the principle of the thing was new to me. The maker of the wheel told me that a wheel eight feet in diameter would raise water through a two-and-a-half-inch pipe to a height of twenty feet. The height to which it is raised depends upon the number of coils in the interior of the wheel. The wheel I saw was covered with Russian-iron sheeting, so as to make it air-tight, except for the opening at the offset, and I suppose that compressed air has much to do with forcing the water so far above the surface. A good feature of the wheel is that it need not be permanently fixed anywhere. It is set between two scows, and therefore rises and falls with the current. It was well worth while going a good distance to see it work." — *Cheyenne (Wyoming) Leader.*

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Andrew T. Taylor, F.R.I.B.A.
Architect

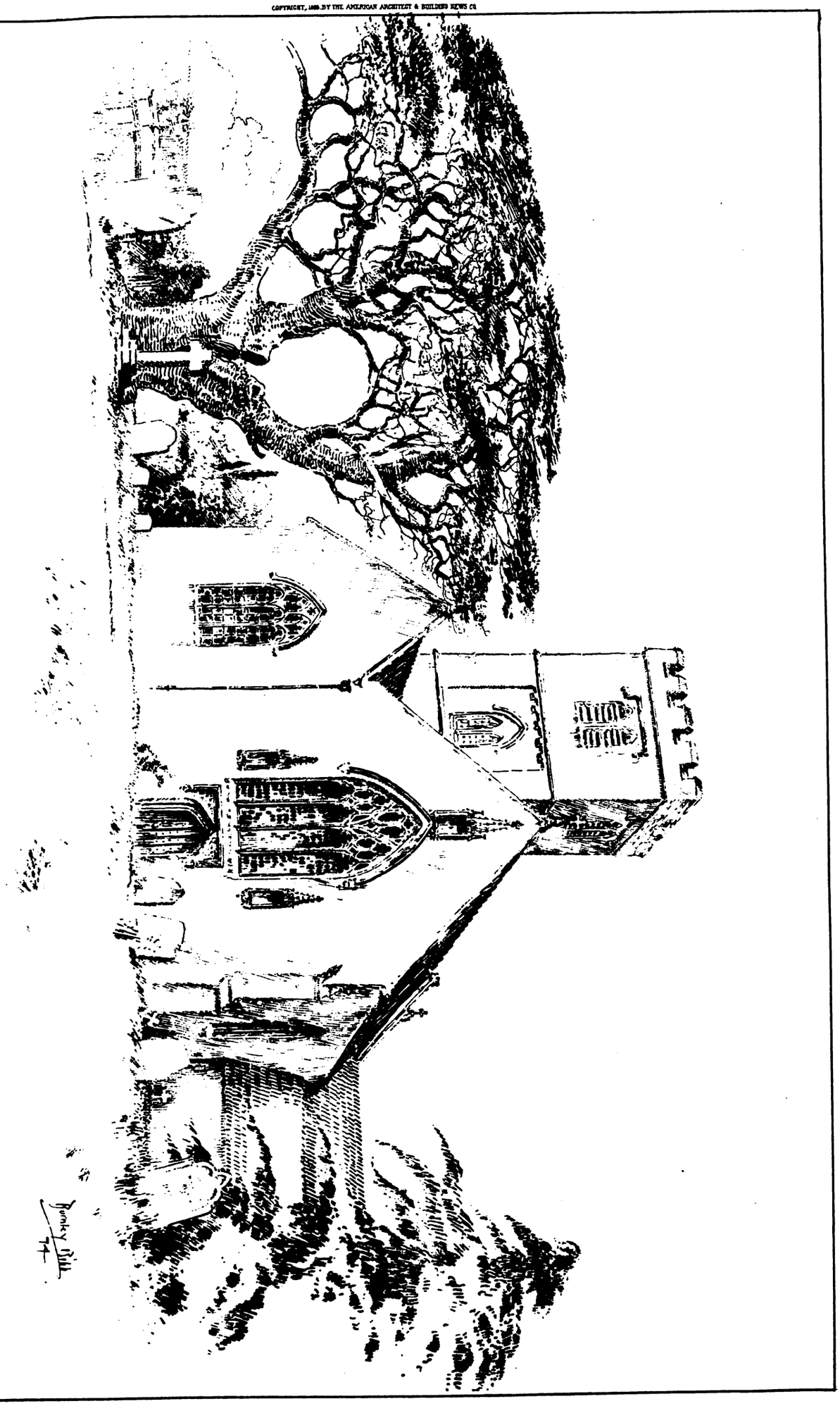


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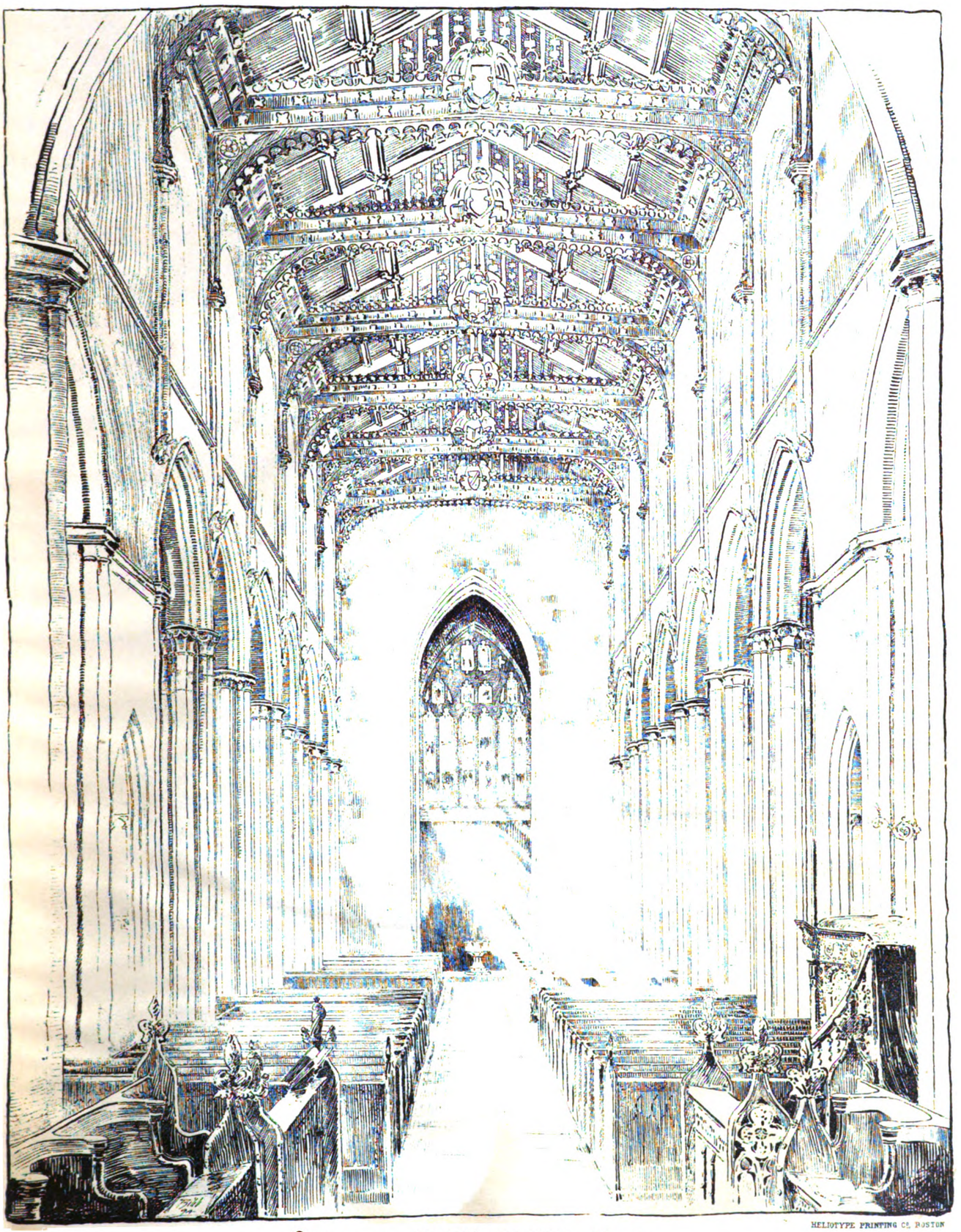
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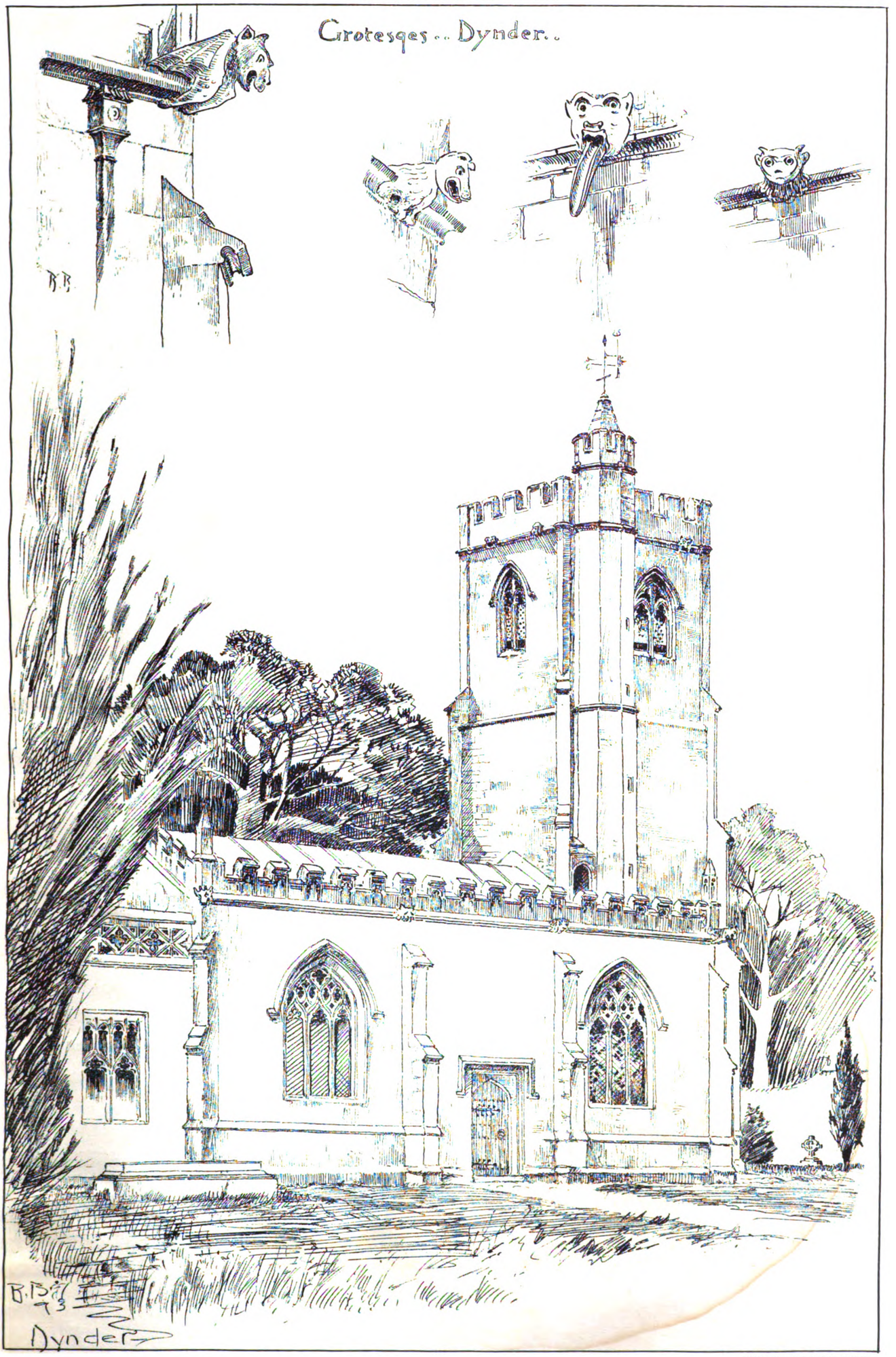
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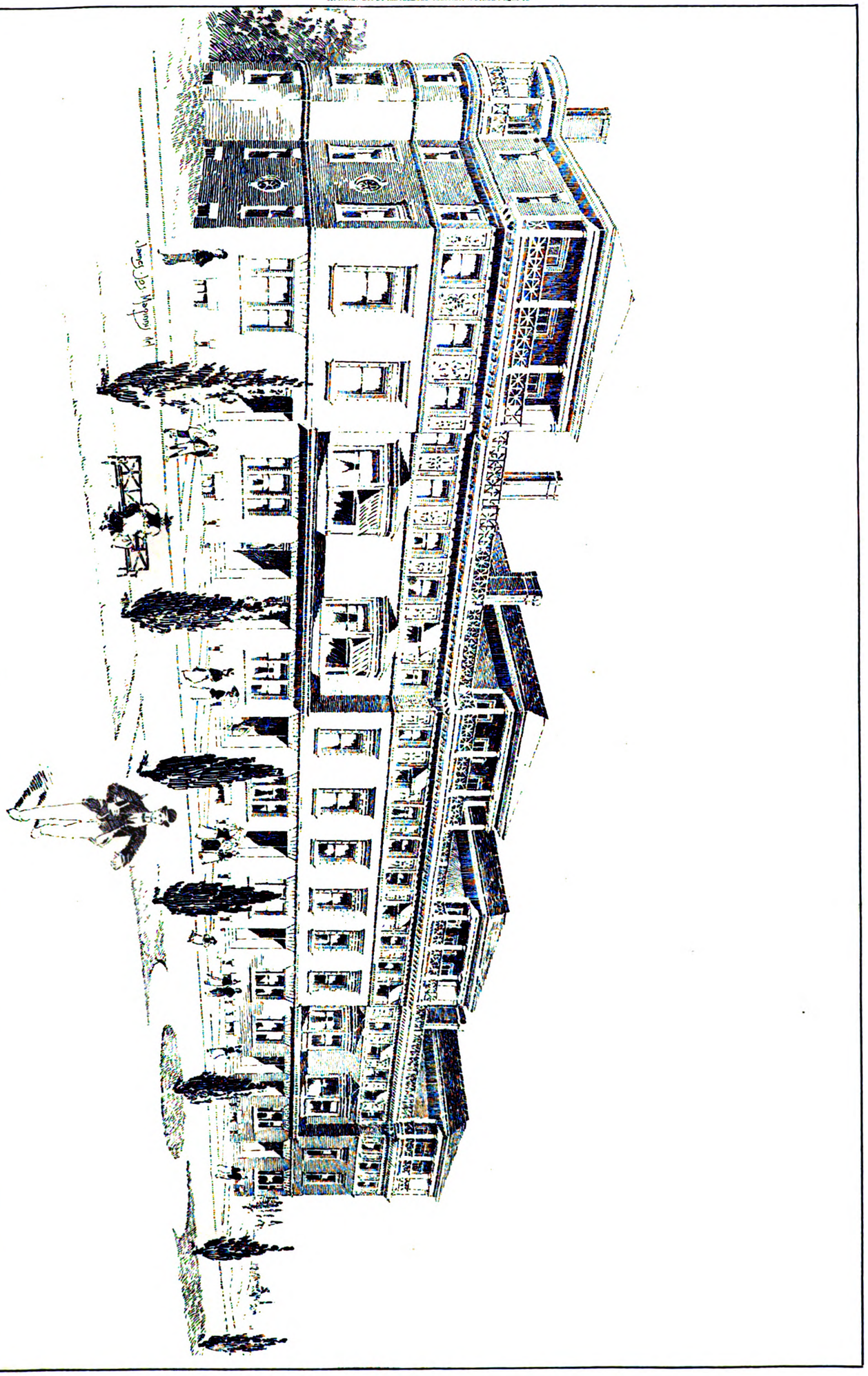


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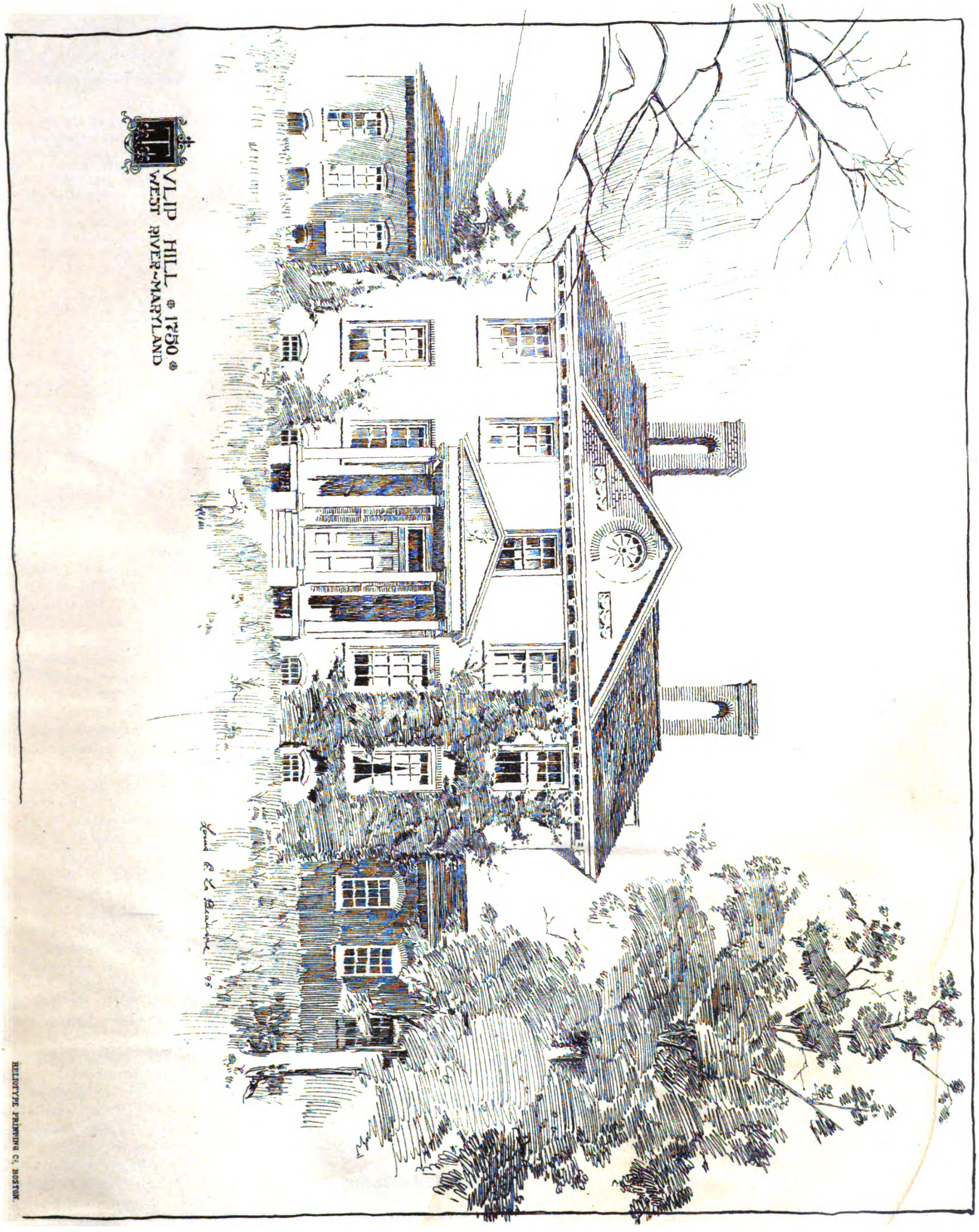
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THE tenement-houses belonging to Trinity Church, in New York, have for years been a favorite object of attack by newspaper reporters, especially during the dull summer season, when it is difficult to find interesting matter to fill the columns of a daily journal. By force of circumstances, the parish has come into possession of eighty-three tenement-houses, inhabited by nearly seventeen hundred people. A large part of these houses are old, and not provided with what are supposed to be modern conveniences, and the Vestry has not thought it necessary to take the advice of newspaper reporters as to how it should manage its property, so long as its tenants did not appear to be suffering from any neglect. Quite recently, however, the President of the New York Board of Health has made an official statement, in which he asserts that the mean death-rate in the Trinity tenements is about one-third larger than the average death-rate throughout the city. It is needless to say that this statement has been made the text for a fresh onslaught on the Trinity Vestry, to the distress of so many people, anxious for the reputation of the Corporation of the principal Episcopal Church in New York, that the Vestry has published a pamphlet in its own defence, giving a short history of the controversies in regard to its tenements, and, so far as we can judge, completely refuting the statement of the Board of Health. The historical part of the pamphlet is written by Dr. Morgan Dix, and bears evidence of that truthfulness and sincerity which characterizes everything that Dr. Dix says on any subject. As he says, most of the so-called "tenements," owned by the Church, are small structures, generally two or three stories high, built for private residences, and altered over to accommodate three or four families. The parish has built ten large model tenement-houses, which seem to be above criticism, and, as its eighty-three houses have, in all, less than seventeen hundred inhabitants, it is evident that the number of occupants of the older houses must be small, probably not more than fifteen people in each. These people are of a very poor class. The houses are old, and can be rented at low rates to people who cannot afford to pay anything more than the lowest rents. The New York statutes give the Board of Health great powers over tenement-houses, this term, under the law, applying to every building occupied by three or more families, and they have not hesitated to exercise them in regard to the Trinity houses. Every order that the Board has issued in regard to the Trinity houses has been obeyed, except one, under which, license given by a special statute, the Corporation was directed to furnish Croton water on every floor of its houses. This order was resisted, on the ground that to introduce a water-supply in this way would not contribute to the health of the inmates of the houses, and the position of the Corporation was sustained by the Court of Common Pleas, which held that the statute was unconstitutional, no sanitary necessity having been shown for such a provision. Experts in sanitation will be quite inclined to agree with the Corporation, that the introduction of water and drain-pipes on each floor of these old buildings, only two or three stories high, would not tend to improve the health of the people living in them. Very recently, however, the Court of Appeals has reversed the decision of the Common Pleas, on the ground that the statute might have been intended to promote protection against fire, and would be constitutional on that ground.

MEANWHILE, the Corporation has looked after its houses with reasonable care, at least. More than twenty years ago, the Vestry passed an order requiring that all new leases should contain a clause prohibiting the sale of wine, ale, beer or spirituous liquors by any tenant, or under-tenant, or occupant of the leased premises. This order has been strictly enforced, so that there are now but seven places on the Trinity property, all held under leases made before the passage of the order, or under renewals, provided for in the lease, on the same terms of the original lease, where liquor is sold; and it was recently brought up as a grievance against the church, that it would not allow liquor sold in its houses on a certain street, on which it held a good deal of property, and thus depreciated the value of other property on the street; yet the daily papers amuse their readers, as Dr. Dix says, with such headlines as "Trinity's Saloon Income"; "Trinity Worse than Tammany," and so on. As to the death-rate, Dr. Dix would naturally be unable to speak with authority, so the Vestry has had an investigation made by experts, the results of which are given at length in the pamphlet. Although the expert, Mr. Hoffman, says, early in his report, that the statement of the Board of Health, in regard to the Trinity death-rate, contains "the most astounding abuse of statistical method ever employed by a writer on statistics, or the official of a Board of Health," the rest of the report is in a cooler vein. He not only shows that the comparison of the vital statistics for a population of seventeen hundred with those for a community of a million and a half is unscientific and misleading, but proves that the figures taken as representing the average city death-rate were erroneous. Studying the mortality, as given in the Board of Health's own statistics, of a single district, of about eleven thousand inhabitants, more than eleven hundred of whom are occupants of Trinity tenements, he finds that the death-rate throughout the district, in the last year in which the figures are given, was 28.45 per thousand, while in the Trinity tenements, taken by themselves, it was 21.66, showing, not only that the Trinity population enjoyed health about twenty-five per cent better than their neighbors, but that their good health materially improved the average showing for the district. We will not follow these figures further, except to say that Mr. Hoffman's position, that the Trinity tenements are, at least, as wholesome as the neighboring houses, is confirmed by the statistics of causes of death in them, as taken from the city records, as compared with those of the city at large, which show that the characteristic zymotic or tenement-house diseases, such as croup, scarlet fever, diphtheria, typhoid fever and intestinal diseases, cause fewer deaths in the Trinity houses, in proportion to the number of their inhabitants, than in the city at large. Curiously enough, the balance is made up, in the Trinity tenements, by a preponderance of nervous diseases, consumption and pneumonia. Why these should flourish on the Trinity lands it would be interesting to inquire, but it is quite certain that they do not come from overcrowding, filth, or any other cause within the control of the Trinity Vestry.

THE *Engineering Record* makes a good point in a recent editorial, in which it calls attention to the curious way in which public work of an engineering character is almost always put under the charge of a Commission which does not contain a single member with any knowledge of such work. It says that the ordinary excuse made by public authorities for this eccentricity is that professional men do not know enough about business matters to be entrusted with the expenditure of large sums of public money, but it points out that

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enormous amounts of private capital are successfully invested under the care of engineers, and, we may add, of architects, while the monstrous robberies perpetrated during the earlier construction of the Croton Aqueduct, under a Commission of laymen, which were stopped when the work was put in charge of an engineer, show that, at least in one case, the engineer understood the business part of engineering quite as well as the laymen. Moreover, as it says, the Pennsylvania Railroad, perhaps the best managed railroad corporation in the world, and certainly the best in this country, has had three civil engineers successively as Presidents, and these gentlemen have managed the finances of the great corporation with as much skill as they have directed the work of construction and maintenance of the road and rolling-stock. In fact, to older readers, the contrast between the Pennsylvania Railroad of twenty-five years ago, with its constant broils with competing roads, its financial losses, and depreciated stock, and the same road under engineer management, peaceful, solid and prosperous, affords a striking lesson in favor of having property managed by people who know something about that sort of property, rather than by "financiers" whose sole distinction lies in their ability to float new issues of bonds.

IN regard to the general matter, we have always thought that the pretence that architects and engineers could not be entrusted, as representatives of the public, with the expenditure of public money, because, as professional men, they would not be likely to possess the necessary "executive" or "business" qualifications, was a mere formula that no one believed, and least of all those that used it. Every one knows that commissioners are, in point of fact, usually appointed in return for political service, or on account of their bland smile, or because they have in some way ingratiated themselves with individual statesmen, and that their business qualifications, as shown by their management of their own finances, are very rarely of an exceptional character; while such executive ability as they may have is, in most cases, hopelessly swamped from the moment that they undertook to carry out operations of a kind unfamiliar to them, in such a way that the unctuous amiability of their relations with the world in general may not be disturbed. Even where such appointments have not been reserved as "plums" for "magnetic" politicians, they have, hitherto, generally been given, even in good faith, to people who knew nothing about the work assigned them, in preference to those that do, simply through that singular jealousy of professional men that has been so marked a trait of the average American character. Until within a few years, it has seemed as if an ordinary American could not abide the thought that any one knew more about any subject than he did, and systematically slighted and ignored every one who laid claim to superior knowledge. Latterly, this feeling has been passing away, owing, no doubt, as much to the increasing civilization and "differentiation," as Herbert Spencer would say, of our people as to the increasing difficulty of the problems in construction which must be solved; and professional men are more and more employed to serve the public in matters within their own province. Within a few days, the Governor's Council of Massachusetts has taken upon itself to reject one of the Governor's nominations for the extremely important post of member of the Metropolitan Water Commission, with the result that an engineer of high distinction, and exceptional knowledge of hydraulic work, was appointed instead. This is a step in the right direction, and it is the more gratifying, in that it has been taken by the Council, a small body of men, who are annually elected by popular vote, and therefore representing accurately the more intelligent public opinion of their respective districts. The applause with which the recent appointments to Commissionships in New York have been received, although primarily due to rejoicing at the purification of the public service which they were intended to effect, seems to have included a feeling of satisfaction that the work was to be done by people who knew how to do it; and it may be hoped that this feeling has secured a good footing among us.

CHARLES READE in his "*Put Yourself in His Place*" introduces a character who keeps in his dining-room the portrait of his sister turned faced to the wall and bearing on the back — because the original had married a manufacturer — the inscription, "Gone into trade!" a species of decoration well calculated to excite the wonderment of a guest. It is with a similar feeling of wonderment that we receive notice that Mr. Dankmar Adler, of Chicago, has terminated his partnership with Mr. Sullivan and has "gone into trade." Without attempting to discern the causes which have led to this change of pursuit, we may express the hope that sooner or later he may find his new calling less satisfying than the practice of architecture and so may return to his normal occupation. It is so commonly known a fact that the burdens of architectural practice are so grievous that melancholia and madness are often the fate of the devotee, that no one can be surprised that Mr. Adler abandons it for a calling which, if not more exhilarating, is certainly more elevating. One consequence of this step is deplorable and that is, that in consequence of it Mr. Adler's connection with the American Institute of Architects must, according to custom, be terminated. As he has always been an active and influential member, whether as ordinary member or as Secretary, the loss will be a very appreciable one to the organization. He has the happy faculty of being able to think upon his feet, and many a time this has enabled him to divert at the last moment the stampede that was threatening to result in some undesirable piece of legislation, and yet while capable of acting as brake and governor, he was at proper times both aggressive and progressive.

THE beautiful trees which adorn the boulevards of Paris have, of late, shown such signs of illness that an inquiry has been ordered into their condition. M. Mangin, Professor of Chemistry at the Lycée Louis-le-Grand, has been commissioned to test the soil in which they grow, and has just presented a report, in which he shows that sufficient cause exists for their sickly appearance. The worst evil from which they suffer is, he finds, the saturation of the soil with salt. Curiously enough, while the use of the salt for removing snow from the streets in winter is forbidden in our cities, on account of the injurious effect of the melting snow and salt on the feet of horses, it is very popular in Paris, and the boulevards flow with brine after heavy snows. This brine, as M. Mangin finds, soaks into the soil, especially around the trees, as the surface elsewhere is protected by the asphalt pavement, so that in some places he has found the proportion of chlorides to be many times greater than the limit considered allowable in cultivated soil. Besides this, he finds, as has often been found before, with trees growing in the midst of asphalt pavements, that their health suffers from want of air in the soil. It is hardly necessary to say that the roots of trees are nourished by moist air, the air being quite as necessary for them as the moisture, and that an adequate circulation of air in the soil is an important factor in vegetable growth. This circulation must be checked to a considerable degree by the asphalt coating over the soil surrounding the open "*cuvettes*" in which the trees stand, and M. Mangin finds that, while the trees put forth rootlets in the usual abundance, a large part of the rootlets die, so that, as he says, around some of the trees the soil is still further choked with these dead and decaying fibres. What the Parisians will do to save their trees, of which they are justly proud, remains to be seen, but they are quite sure to make some well-considered attempt to restore them to health, and we shall find profit in watching their proceedings.

A NEW sort of plaster-work is coming into use in Paris. There, as here, plaster relief-work for ceilings is fashionable, but, as commonly executed, is very expensive, besides being heavy, and very likely to cause cracks in the ceiling on account of the wooden furrings which are required to support it, and which form a mass of woodwork, first wet and then dry. To overcome the practical difficulties of such work, and lessen the cost of it, a practice has arisen of casting enriched cornices, beams, panels, centre-pieces, rosettes and so on, in staff, furnished with a facing of fine material. The staff is light and cheap, and the cornices and ribs can be bought in lengths, cut off in a mitre box, and attached to the ceiling with plaster-of-Paris. Of course, for good work an architect would wish to design all such details himself, but even then there would be great economy in having the ceiling, ribs and rosettes, as well as the cornices, made under his supervision in the shop, and put up afterward, instead of running the mouldings in place, and sticking on the enrichments subsequently. Our ancestors, in the time of Queen Elizabeth, although they are said to have made their beautiful ceilings in place, used a coarse material, fibrous and light, very much like the modern staff, and they certainly produced admirable effects with it.

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STREET PAVEMENTS.[1]



Old Tavern, Sackett's Harbor, N. Y.

ALL roads and streets serve for purposes of intercommunication and traffic; city streets, however, are planned with the further object of providing light and air to the adjacent houses, and, incidentally, are utilized as receptacles for a network of underground pipes, conduits and wires which afford drainage and sewerage facilities, and furnish water, gas, heat, light, steam and electric power, etc., to the buildings. When we demand, even of our country roads, that they should not be dusty in dry weather, nor muddy and impassable in wet seasons, it is obvious that city streets, in which our habitations, offices and places of work are located, should be subject to much stricter requirements. We are, as far as this paper is concerned, interested chiefly in the sanitary aspects of street construction or the paving of its surface. The essential requirements of a good city street pavement are quick surface-drainage, good foundations, impermeability and hardness of surface, avoidance of slipperiness, least resistance to traffic, cleanliness and noiselessness. Impermeability and noiselessness are the chief desiderata from a sanitary point-of-view. There is plenty of medical testimony available tending to prove that the ceaseless noise, from early morning till late at night, due to vehicles passing over rough stone pavements, affects the nervous system and reduces the duration of life.

A street surface should be as watertight as possible, to prevent a downward soakage into the ground of liquids, or the retention of filth in the joints and cracks of the paving stones. The street surface should drain off quickly, and there must be no depressions or inequalities where water can stagnate and become offensive. A street pavement should not be slippery, as this not only causes horses to fall, but is equally dangerous to life and limb of pedestrians. Cleanliness of pavements is essential to prevent dangerous exhalations, and illness due to polluted air. Finally, paved streets should be noiseless, for the continuous jarring and rumbling of heavy vehicles, the shaking of the foundations and the accompanying vibrations of window-panes, doubtless affect the nerves of town-dwellers, disturb sleep, aggravate the suffering and retard the recovery of the sick.

For these and similar reasons the selection and construction of a good street pavement is a sanitary problem of much importance. Leaving out of consideration some kind of pavements which are not used to any great extent, the choice lies between macadam, wood, cobblestone, granite block, and asphalt pavements.

Macadamized roads are not well suited for city pavements. Under a heavy street traffic, the broken stones, particularly if the softer limestones are used, are quickly ground to powder, causing clouds of disease-breeding and irritating dust in dry weather, while in wet weather the dust is quickly changed into the worst kind of soft mud. The surface of macadamized roads wears out very quickly, and almost the only advantages worth mentioning are that such roads are noiseless and that they afford a firm footing for horses.

Wooden pavements have formerly been employed to a large extent in Amercian cities, but of recent years they have been given up, partly, no doubt, on account of the growing scarcity of timber, due to the barbarous destruction of our forests. From a hygienic point-of-view, wooden pavements, unless the blocks are impregnated to prevent decay, offer several important objections. In the first place, wood absorbs not only dampness, but likewise putrefying matter, and exhales bad odors, and being alternately wet and dry, the surface soon rots. It is a well-known fact that decaying wood is detrimental to health. Wooden pavements, on account of their elasticity, are more noiseless than stone pavements, but they are expensive to maintain, and soon their surface becomes quite unequal, except when the precaution is taken to lay the blocks on a concrete or sand foundation.

Cobblestone pavements are of a very inferior character, on account of the uneven surface, due to absence of proper foundation, and the rough joints and numerous pockets, due to the irregularity of the stones. The joints of such pavements soon fill up with putrefying street filth, and create obnoxious odors. Such pavements are very difficult to maintain in a clean condition and, taken altogether, they are unfit for the thoroughfares of large cities.

Granite pavement, if composed of stones of regular size, evenly laid, well bedded on a good concrete foundation, and with the joints carefully filled with sand, or cement, or tar and gravel, is a good city pavement for heavy traffic. The stone blocks should not be too hard, as they otherwise become quite slippery from abrasion, and the evenness of the pavement is usually disturbed by the frequent tearing up required for underground pipe-connections. The improved stone pavements with well-filled joints have the one disadvantage of causing increased vibration of buildings.

The best pavement, from a sanitary point-of-view, is, without doubt, the asphalt pavement, and it is destined to become the favorite pavement for streets with light traffic. It is watertight, quite impermeable and prevents soakage into the subsoil; it is free from the noxious odors so often found on pavements with joints; it is durable and smooth, very readily cleaned; it renders all traffic noiseless, does not cause jarring or vibration of buildings, and creates no dust due to abrasion and wear. Almost its only disadvantage is its liability to become slippery when the pavement is damp or greasy, as during foggy weather, or where soft mud is carried to it from adjoining stone pavements, by horses' hoofs, pedestrians' shoes and carriage-wheels. It is principally adapted to the residential parts of cities, where there is no heavy traffic; owing to its noiselessness, it is also preferred in the neighborhood of court-houses, schools, hospitals, etc.

Other durable pavements are the vitrified paving-blocks, the asphalt blocks and brick pavements, in the laying of which, particular care should be given to the filling-in of the joint spaces.

Footpaths and sidewalks are paved with flagstones, or with artificial stone, with bricks laid flat, or with asphalt, and these should also be laid so as to afford good drainage into the gutters and must be maintained so as not to become slippery. Gutters must be constructed with care, to avoid leakage of storm-water into the subsoil and the cellars of houses.

I have already alluded to the fact that city streets serve also the purpose of receptacles for many pipe conduits. In our large cities the number of different pipe-lines buried under the street surface is constantly growing. We have not only one or several street water-mains, gas-mains, sometimes separate mains for fuel-gas and lighting-gas, sewers for rain-water and house-wastes, and in the "separate" system two lines of sewers, but also electric-light conduits, telegraph wires for commercial uses, for fire-alarm system and for police telegraph; telephone wires, pneumatic conduits for mail, parcel delivery and telegraph messages; electric or pneumatic conduits for synchronized clocks; compressed-air mains, cables and trolley-line wires, steam conduits, hot-water pipes, pipes for cooling purposes and what not. At street intersections the network of pipes is particularly crowded, for here we find, in addition to the above, the sewer manholes, the catch-basins, the shut-off valves for water and gas and the man-holes on subways for electric and telegraph wires.

In order to avoid the endless tearing-up of streets and pavements, and the incidental disturbance of traffic, caused by repairs or connections to the various conduits, it has been frequently suggested to build subways in the more important streets, and to place all the above-named complicated network of engineering conduits and pipes in the same. While this would, doubtless, tend to secure a more permanent street surface, it involves a very large outlay of money for construction, and the remedy suggested is by no means free from objections. Some of the most experienced municipal engineers have been opposed to the construction of subways. Much may be said on both sides of the question, but it would lead us too far to discuss the subject in detail. It is, doubtless, true that the maintenance of a permanent street surface is rendered difficult owing to the continued and repeated breaking-up of the pavement for connection of water, sewer, gas and electric conduits.

STREET-CLEANING AND STREET-SPRINKLING.

We have learned how necessary good street pavements are, not only from the traffic point-of-view, but more especially from a sanitary standpoint, for the maintenance of the health of a city. But the advantages of well-paved streets count for nothing, if the pavements are not thoroughly cleaned at regular and frequent intervals.

Street-cleaning, in the widest sense of the term, includes the sweeping of roadways, sidewalks and gutters, the collection and removal of the road-dirt, the sprinkling of streets, the removal of snow, the cleaning and disinfection of public conveniencies, the cleaning and flushing of sewer catch-basins and the removal of house-refuse. I shall leave the latter out of present consideration — as it will be referred to farther on, when speaking of scavenging — and shall restrict my remarks to a discussion of street-dirt. The maintenance of city streets, and the scientific administration of street-cleaning in large cities require a great deal of engineering knowledge, practical skill and judgment, besides not a little executive ability. It is not often, however, that the matter is considered in this way. Many instances could be quoted where, in municipal departments, mere politicians are placed in charge of the street-cleaning bureau, no doubt because street-cleaning — like the construction of a State capitol — often involves the employment of a large force of laborers whose political vote may thus be controlled at election time. Street-cleaning may legitimately be considered one of the important problems of sanitary municipal engineering.

[1] Abstract from lecture on "Sanitary Engineering," by Wm. Paul Gerhard, C. E., delivered before the Franklin Institute, February 15, 1895, and published in the *Journal* of the Franklin Institute, for June and July, 1895.

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Viewed in this light, the recent appointment, by a reform mayor, of an able civil and sanitary engineer, of high reputation, to the position of street-cleaning commissioner in the City of New York, cannot be too highly commended.

The quantity and the composition of street-dirt depend upon a great many points, such as the character and material of the pavement, the width of the street, the density and class of population, the nature and size of the traffic, the condition of the weather, etc. Road detritus is composed chiefly of abraded particles of stone, wood, iron and shoe-leather, gravel, sand or mud from the subsurface, the horse-dung and urine of animals, mixed together with house-refuse, ashes, street and yard sweepings, more or less garbage, dead leaves and other vegetable matters. Some of this dirt, and particularly that of animal origin, becomes absorbed in the joints or cracks of ill-laid or ill-kept pavements, where it keeps the subsoil damp and contaminated, putrifies and causes noxious smells and disease-breeding emanations. A part of the street-dirt is breathed directly into our lungs, or enters the alimentary canal, and may cause internal diseases. When the March winds blow, and in dry seasons generally, the dust and dirt of streets is wafted about in the air, becomes injurious to the eyes of pedestrians, and is driven or blown into our houses, where it soon settles on the skin and the clothes of persons, on furniture, draperies, curtains and carpets. To avoid this, windows are kept closed and thus the rooms of our houses do not receive the necessary change of air. The street-dust is also highly injurious to tradesmen's and shopkeepers' goods. When wet, the dirt is changed into street mud, which is destructive to people's clothing, shoes and to carriages. Muddy and greasy streets also become a source of trouble by being slippery, and causing on sidewalks, street-crossings and in the carriage-ways numerous accidents to life and limb, to men and horses. As a rule, street-dirt or mud is particularly bad about public hack-stands, on open squares, near hotels, theatres and railway stations. Regarding the comparative quantity of street-dirt from different pavements, an English engineer is authority for the statement that one cart-load of street mud is, on the average, removed from 344 square yards of macadam, from 500 square yards of granite, 1,666 square yards of wood and from 4,000 square yards of asphalt pavement.

It is well known that streets in a bad condition are an obstruction to traffic, and that they necessitate a waste of energy and tractive force. We are accustomed to consider muddy streets as an annoyance, and condemn unclean streets principally on account of untidiness of appearance. Very few people, however, take into consideration that owing to air and soil pollution, caused by accumulation of dirt and refuse matter and soakage of liquid impurities, there is a powerful influence on public health which by far outweighs all other disadvantages. It is a fact that clean and well-kept streets cause a marked reduction in the death-rate of large cities, particularly as regards malarial and pulmonary ailments. Children playing in unclean streets are more or less affected, being often much more susceptible than adults; the same is true of invalids, and people not in robust health. Sanitary science, therefore, requires that the street surfaces be impermeable, and that all thoroughfares should be kept scrupulously clean. Near children's schools, near institutions and near hospitals, the streets should, for obvious reasons, be swept with particular care, and be arranged with a view to perfect drainage. In all advanced schemes for the ventilation of buildings, the fact that street-dirt is injurious to health is taken into consideration, by providing special means for screening and filtering the air-supply from out-doors, or by washing out its impurities. Dirty and dusty streets exercise, at all times, indirectly, a baneful influence upon the salubrity of habitations, because they prevent the free ventilation of living or sleeping apartments by the opening of windows.

We have yet much to learn from Continental cities, which are far ahead of ours in the matter of street-cleaning. This fact is generally conceded by all Americans who have travelled with open eyes through Europe, and who have admired the tidy and well-kept streets of some of its capitals. It is a matter beyond comprehension to me how the mayor of a large American city, after returning from a trip to England and the Continent, could have stated, as the newspapers reported, that in the matter of street-cleaning American cities had nothing to learn from cities like Paris, London, Berlin or Vienna.

The work of street-cleaning presents difficulties which are not easily surmounted, chiefly on account of the enormous quantities of street-refuse to be removed daily. It is accomplished by scraping, sweeping, washing and flushing. The sweeping may be done by hand labor, with brooms, or else by the use of special machinery. Owing to the greater rapidity with which work is done, there is economy in using the best machinery, implements and tools available. Mechanical sweepers should displace hand labor, for street-cleaning by hand is from three to six times as expensive as cleaning by the aid of machines. It is a curious fact that the first street-cleaning machine, devised by Sir Joseph Whitworth, was rejected "as interfering with the labor for poor people." Street-sweeping should always be done without stirring up dust and dirt. Hence water is needed in street-cleaning operations, and all streets should be sprinkled before sweeping.

Carelessness in street-sweeping should not be tolerated. In all large cities, street-cleaning should preferably be done at night. The method of cleaning streets by washing the filth and dirt into the gutters and catch-basins, and thence into the street sewers, cannot be approved, except in special instances, as it simply transfers the dirt from the street surface to the catch-basin and the sewer. Dry removal of street-dirt in large, well-built covered carts is much to be preferred. Horse-droppings on important thoroughfares should always be picked up at once and removed with brushes into hand-bags. The fact should be noted that the extensive application of steam and electricity to replace horse traction on surface roads tends to reduce the amount of organic street-dirt. The ultimate disposal of the collected street-refuse is another problem which may present difficulties in large cities with many miles of pavements.

REMOVAL OF ICE AND SNOW.

A problem which in winter-time taxes the ingenuity of the engineer of a street-cleaning department to the utmost, is the removal of a sudden fall of snow, particularly when the snow-storm is accompanied by high winds, causing the snow to collect in drifts. The snow, accumulating on sidewalks and footpaths, must be swept off by the adjacent householders, and fines should be enforced for non-compliance with the city ordinances. The snow is best removed as soon as the storm subsides, for when hard trodden, the mass is more difficult to handle. Sidewalks in front of vacant lots or unoccupied houses should be, under all circumstances, included in the city regulations, and if their owners are negligent, the cleaning should be done by the city, and the cost assessed upon the property.

The removal of snow from the carriage-way is difficult to accomplish when the fall is heavy. Few persons realize the enormous quantities to be removed. Street-railroad companies, after using the snow-plough to clear their tracks, should, by city ordinance, be required to remove that portion which they pile up outside of the tracks.

The mode of disposing of the snow varies according to the location of a city. In districts which adjoin a river, or canal, or a harbor, the snow may be dumped from the carts into the water. In some cases it is thrown into the sewer man-holes. Owing to the fact that snow from frequented thoroughfares is generally mixed with street-mud and road scrapings, the former method is often objectionable, as it causes the harbor or water-course to silt up and necessitates dredging, and the second method should only be adopted if the sewers are simultaneously flushed with large quantities of water, otherwise it leads to deposits of mud on the sewer inverts. Melting the snow by fires, or by steam-jets has been tried, but it is a slow and expensive proceeding. The use of salt to hasten the melting of snow is quite objectionable, as it causes a deep slush, and should only be tolerated when the slush is at once swept into the street gutters. Salting sidewalks, or car-tracks, is very objectionable from a health point-of-view, as the mixture causes much cold dampness, ruins pedestrian's clothing and shoes, is injurious to horses' hoofs and causes the feet to be severely chilled, inducing colds, pneumonia or the grippe.

STREET-SPRINKLING.

In summer-time, and in dry weather generally, city streets should be sprinkled, to cool the air in hot weather, and to keep down the street dust with its many annoyances and inconveniences. Street-sprinkling is accomplished largely by means of watering carts or vans, but sometimes hose-jets are used, or the street is watered by means of perforated pipes on wheels, attached directly to the street-hydrants. The latter method is particularly adapted to well-kept impermeable asphalt pavements. The beneficial effect of street-sprinkling upon the air is very marked; the air is washed of impurities, it becomes refreshed and a feeling of relief is experienced similar to that after a thunder-shower. It is a mooted point whether street-sprinkling should be done by the city from the general-improvement fund, or by private firms or corporations paid by the property-owners of streets. I cannot see why street-sprinkling should not be looked upon as a part of the general street-cleaning system. The general traffic and pedestrians are certainly benefited by it quite as much as the owners of the property bordering on the street. It has been suggested in sea-board towns, to water the streets with sea-water, and the matter seems well worth trying, as it reduces the demand made upon the general city water-supply in periods of drought, and also because salt water keeps the street surface damp for a greater length of time.

CLEANSING FOOTWAYS AND SIDEWALKS, STREET-CROSSINGS, GUTTERS.

The sidewalks of streets should be kept scrupulously neat and clean. All accumulation of mud should be avoided, because it tends to make the sidewalks slippery. In winter, snow should be regularly removed, and when ice forms, it should be covered by the householders with sand or ashes, to prevent accidents and to avoid damage suits.

All street-crossings need the particular attention of the street-cleaners. They should be cleaned, swept and the mud raked off, and during snowfalls they ought to receive attention first, so as to reëstablish the regular street traffic with as little delay as possible.

The maintenance of the street gutters is particularly important from a sanitary point-of-view. Filthy gutters in hot weather are a source of danger and cause noxious odors. They should be daily swept and kept unobstructed, to secure a rapid drainage of the street surface; there should be no pools of stagnant offensive liquids in the gutters; they should be kept impervious to avoid leakage into

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the subsoil or into cellars, and they should have a continuous grade to the nearest sewer inlet. After snowfalls, gutters and inlets of catch-basins must be kept clear, so that when a thaw occurs there will be no flooding, rendering street-crossings impassable.

REMOVAL OF REFUSE, GARBAGE DISPOSAL, SCAVENGING.

While sewers are intended to remove from habitations all liquid and semi-liquid organic matters, the solid refuse of a city, of its houses and streets, comprising ashes, offal, garbage, house-sweepings and street-refuse must be removed by cartage. Sir Robert Rawlinson, one of the foremost sanitary engineers of England, calls scavenging one of the important features of city sanitary engineering. In dealing with this problem, distinction is often made between regular and special refuse. It would be tedious to you, doubtless, if I were to enter into the subject fully, enumerating at length what constitutes ordinary house-refuse. I shall, therefore, merely state that all house-refuse should be divided into two distinct kinds, viz, garbage and ashes, the former largely organic, the latter inorganic masses.

Besides house-refuse, scavenging deals with street-refuse, with stable, garden and trade refuse, with market refuse, builders' rubbish and with the mud accumulating in street catch-basins. House-refuse, paper and litter should never be deposited in the roadway, nor should it be thrown into sewer man-holes or catch-basins. Pending removal, house garbage and rubbish should be stored in dust-bins, or in barrels and ash-cans, and it is essential, and by no means difficult to enforce, that separate vessels be provided by householders for the garbage or swill, and the ashes and sweepings. Large fixed receptacles for temporary retention are not as desirable as small portable pails or cans, except possibly for large tenement-houses.

The garbage pails should be of non-absorbent material, and ash-cans should not be of wood, but of iron, to avoid danger of fire from hot ashes. All receptacles should be provided with tight-fitting covers, so that when they are placed on the sidewalk, near the curb, just before the scavenging cart arrives, the ashes may not be scattered by the wind, and the swill and offal may not offend the senses of passers-by when exposed to the rays of a hot July sun. I cannot discuss the details of the removal, except to say that it should be done at regular hours at all times, and that garbage must be more frequently removed in summer than in winter to avoid the emanations due to rapid decay.

The city should, of course, provide separate garbage and ash carts, of solid construction and fitted with covers to avoid a street-nuisance during transportation. In summer-time, householders may help to reduce the amount of offal to be disposed by burning some of the house garbage in the kitchen range.

Regarding the ultimate disposal of city refuse, it is found by experience that much of it may be utilized after sifting and separating the coarser from the finer materials. This sorting of the contents of ash and garbage barrels should never be permitted to be done in the streets. The city-refuse dumps are the places to which rag-pickers should be relegated. All dirt, as Lord Palmerston said, is merely matter in the wrong place. While ashes, cinders and clinkers may be utilized for the filling-up of sunken lots or for making river banks, or roads and pathways, no garbage should be so used, or mixed in any way with ashes. Horse-droppings from streets are salable as manure, and some part of the house offal can be disposed to farmers for like uses. But whatever cannot be utilized in some way must be removed by rail or by water. In harbor towns, city refuse is taken in specially constructed hopper-barges far out to sea, and dumped into deep water. This mode of disposal is not always desirable or feasible, as it may lead to a defilement of the beaches and bathing resorts near the city. There is little doubt that destruction of garbage by the all-purifying element, fire, is one of the best, if not *the* best, method from a sanitary point-of-view. Various refuse-cremators have been contrived which are operated successfully without causing a nuisance by the smoke and gases from the furnance. The ashes resulting from cremation have some value as fertilizers, particularly where sewage sludge or night-soil is mixed with the refuse.

The cleaning of earth-closets, privies, ash-pits, cesspools, vaults and sewer catch-basins is also a part of the city scavenging, but it would lead me too far to discuss the same.

THE SHAPE OF CHIMNEY-FLUES. — Some chimneys are made smaller at the top than at the base of the flue; others are larger at the top; and still others are of uniform size throughout, according to the fancy of those who designed them, writes W. H. Wakeman. Those who advocate the first claim that it is the most natural way to build a chimney, and as the products of combustion ascend they become cooler, consequently contract, and do not need as much space as when they commenced their ascent. Advocates of the second, while they admit that the gases contract on cooling, call attention to the fact that as the chimney is higher, the friction of the contents increases rapidly, and so deem it advisable to enlarge the area of the chimney or stack, as the draught is materially increased thereby. Those who are in favor of the third tell us that the contraction of the gases and other products of combustion counterbalances the friction, and so a flue of uniform size is correct. Each can show chimneys built according to their ideas which are doing good work, but it is a hard matter to show that the same draught could not be obtained with a chimney built according to another design, and until this is done the matter of which is the best must remain an open question. — *Illustrated Carpenter and Builder.*

THE DECORATION OF ST. PAUL'S.[1]



From the Reichstaghaus, Berlin. W. Widemann, Sculptor.

WHEN I was asked to read a paper before the Society of Arts upon mosaic, my first inclination was to decline to do so, because, like all other arts, the art of mosaic is involved with technicalities which, to a mixed audience, can claim but very limited interest. Upon second thoughts, however, it occurred to me that it would be wise to set aside all doubts as to the interest or the reverse of the subject of my discourse, and to remember only the object of it — a noble one, at least — the decoration of our great metropolitan church of St. Paul.

It will be needless for me to enter into an historical treatise upon mosaic, though I shall have to say something about its growth and decline, because books provide such information, and, moreover, the historical side of the question was very fully set before us not long ago from this desk.

It is left, then, for me, with as little egotism as possible, to set before you the history of my experience, which has by this time become very considerable in a difficult and beautiful art, which the longer I study the more enchanting I find its possibilities and the more ennobling its limitations and restrictions.

It will be impossible to avoid technicalities, which will only commend themselves to experts; they are of necessity dull matter, excepting to those who are more or less craftsmen.

It must be remembered that an artist speaks to you primarily and almost entirely through his special language of form and color; his pen may be a useful adjunct, but it will never instil a comprehension of the language of æsthetics unless the artistic sense is already present in the minds of his audience. Color and form can no more be described in words than notes of music. If eloquence and a mastery of language could have succeeded in making English people an artistic nation, the writings of John Ruskin would have done so years ago. We are, in this latter half of the nineteenth century, in a desperate hurry; life is so complicated, so full, so strenuous, and leisure is so rare, that the arts of peace, which demand quiet and study, have but a slender chance of assuming that importance in our lives which they undoubtedly assumed in simpler and less-distracted civilizations. We are to a certain extent the slaves of fashion, ever shifting, ever changing with a rapidity truly appalling, by which restlessness art must suffer more or less, and especially that form of it which is known by the title "monumental."

Monumental art claims no fashion; it is not the result of a moment's exhilaration; it is not the mark of a clique, nor is it the common property of the sale-room; it is essentially non-commercial. To induce a taste for monumental art in England, excepting in a very spasmodic fashion, has always proved to be difficult, indeed it would appear to be well nigh impossible. It was difficult a century ago, when James Barry painted these walls whilst he lived mainly upon bread and apples, and Sir Joshua Reynolds was filling the learned with amazement by his profound discourses upon "the grand style," and his eloquent eulogiums upon that greatest of all modern artists, Michael Angelo. The art of Fuseli, Barry, Haydon and other enthusiasts left but little mark upon the buildings of England. Tom Thumb, the famous dwarf, attracted crowds, while the collection of pictures by Haydon was visited by ones and twos. The particular constitution of the English mind is practical; its predilections are more Roman than Greek; it is more sensible than poetical, more commercial than imaginative.

The Reformation set ablaze whole piles of prejudices: the dread of idolatry, the fear lest matter should be worshipped in place of spirit, strangled every artistic effort in the direction of church decoration. Such violent feelings were national, so that when the Bishop of London was approached in regard to the decoration of St. Paul's a century ago, he not only spoke his own feelings, but probably he expressed also the feelings of the majority when he made answer to a deputation, "that nothing would induce him to sanction the conversion of Protestant St. Paul's into a Popish church."

So the "grand style" of Reynolds, Barry, Fuseli and other considerable artists never came off. Hence, our cathedral remained an example of the dulness of Protestantism, an evidence that England was not ready to re-marry religion and art, which since the sixteenth century had been divorced, to the serious detriment of one as of the other.

Time has, however, wrought change in the aspect with which such matters are regarded. The Oxford movement, greater facilities of travel, and a generally broader and healthier view of religion, and

[1] A paper read by Mr. W. B. Richmond, A. R. A., before the Applied Art Section of the Society of Arts on May 28.

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its consequent emancipation from many narrow crudities, have one and all conduced towards a possibility of that reunion of religion and art which cannot fail to promote vitality and reality to both causes.

So, when the atmosphere of thought was cleared of prejudice and narrowness, it got into the air that St. Paul's Cathedral could not be allowed any longer to remain a standing protest against progress, whilst even the Nonconformists were finding that they must travel a bit with the times, and shed some of the dull feathers of their mournful plumage, and break into song accompanied even by that dreadful instrument, the "devil's box of whistles." And so it came to be again seriously considered that St. Paul's should be decorated in an appropriate manner in accordance with the wish of Sir Christopher Wren, and this time there was no veto put upon the enterprise by a narrow-minded prelate.

Once more that precious votive offering of man's highest intelligence, and his power to create and to dedicate his gifts to God's house, were to be offered in an Anglican cathedral, and which had been for three centuries almost wholly absorbed by that branch of the Christian church belonging to Rome.

That great artist, Alfred Stevens, whose monument to Wellington is worthy of the great general, as it is worthy of this nation, made designs for some of those spaces known as the spandrels below the great dome of St. Paul's.

Another great artist, happily still with us in the possession of his great faculties at an advanced age, George Frederick Watts, designed for two of the spandrels. We now see the result in mosaics executed by Dr. Salviati, of Venice.

Various experiments were tried for the decoration of the choir and the great dome, which, for one reason or another, failed to receive a cordial recognition, notwithstanding the marked ability of Sir Frederic Leighton's and Mr. Poynter's designs, and for a time matters came to a standstill.

The reredos, erected from Messrs. Bodley & Garner's design, demonstrated the absolute necessity for proceeding with the decoration; and it was through Mr. Bodley's advice that I had the honor of being called in to render my assistance. And let me here take this opportunity to express my gratitude to my friend, Mr. Bodley, for his having been the first cause which brought to me a labor that has been, is, and will be, I trust, for some years to come, fraught with the highest pleasure and deepest satisfaction, which entirely outweigh the anxieties and responsibilities of my work. And this is a fitting time and opportunity for me to record my everlasting obligation to the distinguished Dean who has so kindly taken the chair this evening, and to his colleagues for their touchingly loyal confidence granted to me by one and all of them.

In an undertaking so difficult and so full of possible pitfalls, I must here affirm that it would have been impossible for me to have carried out my work as far as I have done with a comparative sense of ease had not I felt at every turn, and under every difficulty, that I was environed by an atmosphere of sympathy and perfect confidence, which increased my energy and desire to worthily carry out the wishes of my friends. I question if in the whole history of art any man has been so happily circumstanced as I have been, or ever worked under conditions more favorable to himself.

One more pleasant recognition before I start upon the egotistic track: My thanks are due to Mr. Harry Powell for his unremitting labor to give me what I wanted in the glass *tesseræ*, as well as in the glass for such windows as I have designed and executed for St. Paul's.

I venture to think that in all respects the materials supplied by Messrs. Powell for my work are first-rate — equal, indeed, to any which were supplied to the mosaic artists of the best periods, Greek or Italian.

To my workmen, whom I regard as brother artists, both those who assist me in my studio as well as those who work so carefully and so steadily in the cathedral, I tender my heartfelt thanks. Instead of increasing my difficulties, one and all of my co-workers have aided me unselfishly and kindly.

When the Dean and Chapter desired me to submit designs for the decoration of the choir, I was fully determined upon certain points. That the only material for such decoration was mosaic, because it can be washed without injury, an absolutely necessary precaution under the condition of London smoke-laden atmosphere. However delightful may be the methods of fresco and tempera painting in the clear air of Italy, or even in country places in England, while London air continues to be charged with every destructive acid, they are out of the question there. And, further, the advantage of mosaic over all other material for decoration lies in the free use of gold and silver which is demanded by the nature of the design that is applicable to the material.

Against pictorial mosaic I resolved to set my face, and to adhere to the principles of design and execution which prevailed in Italy, Greece and Asia Minor during the Classical times of the Byzantine Empire. And while adhering in principle to severe methods of design and simplicity of coloring, to accept and make use of the modern spirit of antiquarian research I determined to follow the precepts of the great masters, by being accurate in drawing and, according to my lights, noble in my choice of form.

But perhaps my most important point, as it appeared to me to be, was that our Metropolitan Church must be decorated by English and not by Italian labor. I am bound to say that if England found herself unable to provide genius and talent for the adornment of her great church, better that it were left alone, to prove once more that we are not an artistic people, but only a race of shopkeepers.

As far as my workmen are concerned, the aphorism of Napoleon has been contradicted. Quite leaving out any estimate of the qualities of my design from the question, of which I am no judge, in fairness it can be said that the mosaic-work in St. Paul's laid by English workmen, the materials for it made in England, proves that, however rash it might have appeared to be at first sight to employ them, there need be nothing but congratulation as regards the choice.

The workmen under me have proved themselves able to compete with and beat their co-workers upon the Continent, a matter of the utmost importance at a time fraught with commercial difficulties and stagnation in the labor market.

Another point upon which some determination upon my part had to be exercised. Whether from false ideas of economy, or, what is more likely, a certain listlessness, modern mosaic-workers have thrown aside the well-tried principles of mosaic manipulation, substituting a method illegitimate, lifeless and unreal. I allude to the practice of fixing the cubes by means of gum upon canvas away in a workshop, far removed from the building that is to receive them.

The process I will not waste my time in describing. Yet, broadly speaking, one aphorism that applies to all decorative art may be permitted me. "Just as a building is erected where it is to stand, so every portion of the decoration of that building, wherever it has relationship to the walls or to the structure, should be executed where it is to remain, in the light and under the conditions of its environment."

If one lesson can be learned which is absolutely sustained throughout the churches of Italy, it is the important fact that an harmonious spirit seems to pervade these churches of every century's labor, even to the seventeenth century; because what we see there, from Lombardy to Naples, are conceptions, conceived as a whole, executed as a whole, and perhaps carried out unconsciously harmoniously with their surroundings; because they were carried out *in situ*, under the ruling of the dominating influence of architecture.

This being duly considered, I had to look around. It was not unnatural that my first thoughts should travel in the direction of Whitefriars Glass Works, where the Powells have been laboring to improve the manufacture of ornamental glass for more than a century. And I was rewarded.

Mr. Harry Powell, as I have said, took infinite pains to supply me with *tesseræ* as good in color as any I have seen; indeed, upon placing them side by side with cubes of Greek and Italian manufacture of the best period of the mosaic art, I am bound to say that they were hardly distinguishable one from the other, either in quality of material or in brilliancy of color.

To start with, I thought a palette of thirty colors, or rather shades of color, was sufficient, and there I was right; that number is much more than sufficient. As my experience increases, eight or ten tones of color are ample if used with art and knowledge as to their relative action. And this limitation of the number of colors is one of the great powers of mosaic, which I will later on briefly explain.

Well, if we were to recede from modern technique and re-adopt the old style, how were we to proceed? You know that there are two cements, water and mastic, in which the cubes are inserted. It is beside our intention this evening to follow to earth every detail of my great enterprise; suffice it to say that, after many experiments, I found a mastic cement answering in every detail to a cement employed in the fourteenth century in the restoration of Andrea Tafi's mosaics upon the dome of the baptistery at Florence. Its advantages are many; it does not dry too rapidly, and it retains a certain modicum of elasticity for a long period.

Those members of the public who have so generously opened their purses for the decoration of their cathedral need not fear that time will prove cruel towards the object of their donations. My cement in time becomes so hard, and the cubes are so firmly embedded with it, that it may in time be said to be like stone. Thus one very grave difficulty was with patience surmounted.

Now came the testing-point of my rash promise to obtain English workmen. Again I applied to Mr. Powell. Two of his young men had already executed a mosaic panel, after a design of Mr. Holman Hunt's. But as their work had been entirely the modern picture mosaic, executed with thin plates of glass in place of cubes, the method which I had determined to employ was to them an entirely new one.

Now, at the outset of my work — seeing that I was to initiate the recovery of a lost art — much as I desired at once to work upon the wall of the church, upon consideration it appeared to me important that the initiative should be made as easy and convenient as possible, seeing what the difficulties of the problems before us must of necessity be. Therefore I built in my garden a shed and a studio, the one for my use, the other for the use of the mosaic workers, who, as time went on, gathered strength in numbers recruited from various sources, till we finally for the moment reached nine workers, and here we worked for four months.

If we were not yet to work upon the wall, what were we to do? I had large slabs of slate cut, well scored with diamond shapes, so that the intonaco to be laid upon them would find a grip; and upon these slabs were executed the first two spandrel mosaics, those which you can see upon the north side of the sanctuary above the arch, between the cornice and the capitals. But I must go back a moment.

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The sketches prepared upon a small scale, the full-sized cartoons, were executed. I chose to make my first essays upon the parts of the church lying midway between the vault and the floor, so that they might offer me a fair chance of trying the strengths of light and dark at a, comparatively speaking, moderate altitude. Thus, I should have a guide for future work by which I could reason what strength would be required at a greater height. These cartoons I made in charcoal for the following reasons: I wished not to compromise myself with elaborate coloring at the outset, for I feared that my practice as a painter might lead me, however carefully I guarded against it, to disregard the peculiar nature of the material I had to use; also it would enforce my being present during the whole proceedings, and oblige me to overlook every bit of work, and in point of fact to do a great deal of it with my own hands; this I did, not only executing a considerable portion, but also learning how to cut up the material so that I might prove to my own satisfaction what could and could not be done in shaping the cubes. I believe in only four shapes as the result of this experience, namely, the cube, the double cube, the equilateral triangle, and elongated cut forms finishing-in sharp points. In order to be exact in the shape of the slabs, which had ultimately to be fitted together and to make a perfect joint when fixed, I cut my cartoons up into the necessary number of shapes, of such a size that each shape could be given to one or two men to work upon.

I made a rule to begin with the outlines, whether in the flesh or the drapery, of working from the shadow, through the half-tint, and so up to the light. A difficulty sometimes occurred in that, as the space became filled up, the cement overlapped and pushed the outlines out of shape; this difficulty was easily met by pressure from the outside of the outlines until they assumed their proper curves. It was no small difficulty at first to persuade my workmen to leave a good margin of cement showing between one cube and another, naturally, for the three of my workmen who had had some experience in paper mosaic, two having worked with Messrs. Powell and one with Salviati, had acquired that evil habit of jamming the cubes closely side by side, thereby quite ruining the legitimate effects of signs of building, so important to mosaic as to architecture, and making, instead of structural design, an indifferent imitation of a picture. I endeavored to beat into their brains the fact that the worst mosaic is most like a picture, and the best mosaic has all the structural qualities belonging to architecture — the one entirely out of place in a building, while the other seems to grow naturally out of architectural forms. After a time I found my men taking a keen interest in the work — intelligently — proving, after all, that Englishmen only need to have sound principles taught them, and insisted upon, to render them as serviceable craftsmen as the world can now produce. Upon more than one occasion they have said to me that they no longer felt mosaic work to be monotonous, mechanical and uninteresting; whereas under the system of cutting the thin slabs of the flash mosaic of Messrs. Powell's into complicated shapes — more complicated than geographical puzzles which we used to put together as children — they wearied of it. I made it a rule never to leave my men in doubt as to my meaning. When I criticised, no work was taken out to be re-done without careful explanation why it was done. I drew diagrams to show what I meant as to the simple principles of building the cubes, worked with them, raised the enthusiasm of those who were to be my prime helpers in a most difficult and responsible work.

For more than three — nearer four — months, day by day, we worked together. At the end of that time I am bound to say that I was much wiser than at the beginning, and I venture to think that all the anger which had exploded and the labor expended during that period were not in vain. I had got my staff into good working trim, as I believe anybody could do if they would never trust to a middle man, that most fatal invention of modern commerce and successful destroyer of enthusiasm, and consequently of life in work and everything that makes art in immediate touch with our most delicate sympathies. Until that incubus is got rid of, and architects as well as decorators limit themselves mercilessly to what they can personally oversee, delegating nothing to a subordinate, and are day by day in immediate relation to their craftsmen, there is nothing to expect for the future but death and sterility for art. At last the two spandrels were completed and carted away to be put up in their place. The wall to receive them was cut back, and the slabs were fixed with bronze screws into leaden sockets inserted into the stone, being bound to the wall with red lead.

And now, with regard to these two spandrels, permit me to be at once frank and brief. I did not use sufficient strength in my outlines — I used my white too liberally — the consequence being that the half-tones are too narrow, on account of the liberal expansion of white. I erred upon the side of light, and neglected broad shades. I hope, however, to have this put right by-and-by, and I feel sure that the same faults have not again been committed. In the meantime, my men being in full working trim, I resolved to attack the small easternmost dome. This dome, saucer-shaped, happily obliged us to begin to work upon the wall at once, and I thought it a good opportunity to put my men into a position of responsibility, as they had just come out of a severe and personal training.

It was not without some difficulty that I persuaded Messrs. Powell, who had never executed anything in mosaic directly upon a wall, that the principle of paper mosaic was not the best and the cheapest; they imagined that their system was quicker, and therefore more profitable. I, on the contrary, held the opinion that upon the economical question they were wrong, and that I was right; but in order to prove my point I had an eagle worked upon their principle. They were convinced, not only upon the important point of economy, but, secondarily, upon the result. My principle took about half the time, and was infinitely more satisfactory when done; indeed, the man who, after having worked with me, lamented that he should have been employed again to go through the deadening drudgery of the modern system.

It is wonderful how quickly the modern mind is accessible to art when it has once grasped the fact of its relation to profit, but you must indelibly prove the profit before the artistic sense is touched. Whatever may be the results of my work, *qua* design, that I have nothing to do with. I am willing to wait a century for an estimation of its value; but one thing I trust to have done, I trust I have forever killed paper mosaic in England, for financial as well as artistic reasons. I hope to have re-established the old plan, which is quicker, cheaper and better than the new; it leads to finer work; it is more certain in its results; it is legitimate in principle, and first and foremost it is infinitely more amusing to the workman, for it stands to reason, if the workman is not amused by his work, it will be lifeless, inarticulate and dead. Drudgery we all have to pass through, but the drudgery that is slavish and leaves nothing for spontaneous expression, and which makes the workman into a shackled slave, can be no more humanizing to him than it can be interesting or touching to the minds of those who review its results.

I have been very careful to retain work which, while it did not come up to my standard of completeness, displayed at the same time a vitality and character which I should have been very sorry to lose. Uniformity of execution of such great magnitude would end in dulness without variety of execution, and the faults of its merits that help to give it life.

No better illustration can I think of than the frieze of the Parthenon, evidently the work of one designer, though executed by several different hands. One recognizes the failure of expression here and there among the triumphs of perfect successes — the halting incompleteness by the side of gem-like finish. We feel the pulse of the workman in the touch of failure, and the work is human; the shadow, as well as the light of the human mind, is there: our sympathies are aroused for the duplex nature of man. A dead level of perfection, a cold accuracy of science, and a perfection to be reached only in such a small thing as a Greek gem, would be quite insufferable when exhibited upon an enormous scale, which naturally demands the exhibition of many and very various phases of thought.

For four months we worked upon the dome. Before commencing the mosaic I offered up my charcoal design. Afterwards I colored it, and again offered up a portion of the colored cartoon. The first was with the object of ascertaining the strength of outline, the second the strength of color. As I see my work now completed in mosaics, I see reasons for certain regrets. My cartoons having been executed in pastel did not receive any reflection upon their surfaces from the nature of the material adopted. The mosaic, however, does receive reflection. The lesson I learned here was to make my outlines and masses far more distinct in the cartoon than I intend them to appear when transposed to another and reflecting medium, because the reflecting surface eats into all the dark surfaces. I also made too many details; in point of fact, in a sense, I put in more work than was really needed. Upon the other hand, one must remember (to compare great things with small) that Phidias completed every figure upon the pediment of the Parthenon *ad unguem*. Some of the most delicious portions of the work were forever hidden from view from the time they left the workshop of Phidias to the time when they were taken down by Lord Elgin. This, to the commercial mind, is labor thrown away, but to the dedicatory spirit of the great Greek artist, his labors meant religious offering to the virgin goddess; his sacrifice through his art was to her; he gave her his best, his truest and noblest self; disregarding the labor he expended he disregarded applause or blame. Sentiment apart, it is my firm conviction that the influence of delicate details, even upon a height, is never wholly lost: it gives a play of color, a mystery, and an interest which breadth alone cannot achieve; it is possible to overdo detail, but it is far worse to underdo it. To overdo breadth ends in baldness, a far greater sin, to my thinking, than an excess in the other direction.

Every portion of a building requires a different treatment, owing, of course, to the manifold effects of light to which surfaces are subjected. In the case of the dome it was desirable to heighten it in effect, rather than to lower it. A dome we can hardly call it, in that its elevation, at the apex of the curve, is not more than 3 feet, so that in point of fact it is more like an inverted saucer than a cup.

As soon as the plaster was stripped and revealed the extremely beautiful brick face — better brick building I have never seen — I at once became aware of the heightened appearance which the eccentric circles of the white-mortar lines between the courses of bricks gave. Oddly enough I had already designed for the dome upon such principles of concentrating circles — to my mind a far finer treatment of a domical surface than by breaking it up in ribs. Fearing that I might miss my intention to add rather than diminish height, the outlines of my form I kept thin, not more than a quarter or an eighth in width, and I made use of brown instead of black. Upon all the interior forms of birds and trees, I permitted myself

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neither brown nor black, and kept all the drawing of the wings, feathers, etc. very bright in color, making use of red, amber, green, blue, gray, both warm and cool, and the high lights of white or a pale lemon-yellow. In many instances, notably in the birds which I wanted to appear whitish, I outlined the more delicate parts of their plumage with silver, so that those outlines, when the silver was not shining, might appear to be light and dark off the white when the silver shone. In the leaves of all the trees I drew the veins with silver, and touched the edges of the leaves with gold. The gold background of the whole design is made of burned gold and the *tesseræ* are laid in circles, concentrating at the apex and widening as they descend and curve. But white I found to spread excessively, dark blue to tell as black, amber color to become quite unreasonably dark, pale cool pinks even grayed very much at a distance, and required to be outlined with a strong red to give their value. Both warm and cool grays can be altered as to their appearance very markedly by the color of the outline by which they are surrounded; outlined with blue, the whole mass by which the outline is surrounded appears to be influenced in a very distinct manner by its environment; so also does the same method hold good when the outline is red. Blue round white intensifies the blue as light, whereas outlined with red, the white appears pink. Strong yellow-greens tell extremely well, but they must be outlined with a thick line of red or burnt sienna brown to give them their proper value. White lines in light green are very disastrous except at rare intervals; either a toned grey or a dull yellow breaks the green best. A black outline to blue is only necessary to divide the blue from gold, or to draw the folds of drapery where the lights of the blue are heightened with gold; the black outlining seems to preserve the integrity of the blue, whereas a red outline turns the blue into purple. A dark outline of blue on green gives a very mysterious effect, but, in that case, the blue must be a very clear one, and of a middle tint quality, otherwise the blue will tend to make the green appear muddy.

I have said I made use of a good deal of silver, notably in the two spandrels and in the dome; I should not use so much silver upon another occasion: it has a great tendency to gray its surroundings. It looks very dark when not illumined. Upon the other hand, when flashing, silver has a greater power of light and of expansion than gold. A line of silver the sixteenth of an inch in width will eat through the lines of black almost as light eats into the lead lines of a window. The appearance of silver is easily attained without disadvantage by drawing a thin line of white and outlining it upon either side with a still thinner line of gold. The experiences in working out the dome were most interesting and instructive; the faults I committed were chiefly due to weak outlines, especially upon those parts of the design which have a golden background. The *tesseræ* which I employed were, on the whole, too small, and from this fact there arose an excess of detail, because I could use a greater number of small *tesseræ*, and so put in more detail in a given space than I should have been able to accomplish with larger cubes.

The gold background to the design I think I may claim as a success. There is no burnished gold used whatever; the more crackled portions of the burnt cake were invariably chosen, lit here and there with brighter portions cut from same cake; and the gold was mixed, that is to say, red, green and blue gold were laid side by side. One reason for the brassy and unpleasant appearance of modern golden backgrounds is due to two causes: the first where the *tesseræ* have been laid too flatly, and too closely together; secondly, only one quality of gold, instead of many, has been adopted. Probably, of the two, the more disagreeable effect is obtained by the too close proximity of the *tesseræ*, but also by the color of the intonaco upon which they are laid. One need never be afraid of letting the ground show the 1-16th or even a $\frac{1}{4}$ of an inch in width round each cube. I would even go so far, under certain circumstances of light, to expand even that width. One is far more likely to err upon the thin than the thick joint. Gold set into a white ground never looks so well as when it is set into a red one, the white outline having a tendency to gray the gold excessively, in point of fact, to silver it; it is better to add white curves among the gold, wherever it is desirable to gray the gold.

I have noticed in old mosaics, notably those at the baptistery at Florence, that the ancients recognized the disagreeable appearance of the white line, for they have taken pains to color the white division with red. It used to seem to me that the Greek mosaicists, employed at St. Mark's, Venice, purposely put spots of black, green, or red among their gold, but I have been obliged to give up that idea upon more minute investigation, and to account for the presence of those black, green and red spots, from the fact that the upper layer of protecting glass has corroded where it has been thinly applied, the gold-leaf going with it. Thus the color of the ground upon which it has been laid has been revealed. These dark spots, doubtless, have a pleasant effect, but I think greater advantage is to be obtained by mixing with the brighter *tesseræ* those which have been exposed to heat, and whose dappled surfaces reveal in thin lines all over the surface the color of their grounds, and so they imbibe both the color and the brilliancy of the metal. Burnished gold must only be used very moderately; it makes a garish effect, except in very thin lines.

In modern Italian restoration of ancient mosaic, bright burnished gold has been set up in the place of dull and broken gold; hence, the old work has been rendered vulgar and garish that was only rich and solemn. The mosaic in the apse of San. Ambrogio, at Milan, has been almost spoiled by coarse restoration in the time of my memory. Red disappears when white gold is used to heighten it in thick lines; it is blackened in the shadow and destroyed in the light, for while the gold shines excessively in full light, and consequently acts through the edges of every neighboring color, so in shadow does it become relatively dark, and an extremely powerful deflector of darks; whereas the modified or crackled gold does not shine so brightly, nor does it reflect and refract dark to the same extent when in shadow. You will probably remember how thin the spiked gold lines are which lighten the draperies of most of the earlier mosaics; how, when the gold flashes, they only seem to illumine the color with which they are mixed, and when they are in shade only gives splendor to that local color. That is the right way to use gold. The black pigment made use of by the old mosaicists, Greek and Italian, as far as I have been able to ascertain, upon close inspection, was of a kind of cinder color, or the gray-black of coke, quite dull and unglossy in surface, and excessively corroded by the heat of the kiln. They had not a good strong black, so, as a rule, they adopted dark brown as an outline that told darker than the indifferent black at their command. It must be admitted that the brilliant light of the Italian skies does not oblige the outlines of forms to be so manifestly insisted upon as in our dark climate; there dark tells with much greater force than here; where, in Italy, a thin outline of brown would be quite sufficient to detach one color from another, and to mark the form, here to achieve the same result, double the thickness of outline and double its depth in color is necessary.

Messrs. Powell have supplied me with a splendid black, quite invaluable; in shadow it tells really black and becomes a deep and pleasant gray when the light falls directly upon it; in reflected light it assumes a sufficiently neutral dark to serve all purposes of a strong outline, so when the work is in full light the black outlines do not cut too sharply — a very unpleasant effect it is when they do — and in the shade they tell out with full force of tone and accentuate the color-portions which are for the time-being in shadow.

I take it that we all learn more by our own mistakes than by what success we may now and then attain, and I apprehend that you, my audience, will gather more good from a detailed account of the growth of my work and of its shortcomings than by a catalogue of my winnings. Not unnaturally one was led into certain mistakes to start with, and these mistakes have gradually taught one right principles — principles not founded upon theory, but upon practice and experience.

To revert to the progress of the work, after the completion of the small dome: As winter was coming on and the scaffolding was not completed, I decided to try two more panels upon slate; these two panels were executed in the workshop at Whitefriars. When these were put in place, I saw the utter futility, once and for all, of such a practice. My cartoons had been made previously, and set in place they looked strong and light, because of the non-lustrous quality of their surfaces. The mosaics, when seen bit by bit, side by side with the cartoons in the workshop, looked right, and unmistakably they are wonderful fac-similes of my drawings, but the moment I saw them placed among their surroundings — deep undercutting of mouldings and darkness — it was quite evident that they must be gone over and considerably strengthened, not so much in regard to their local color as in emphasis of white and black. My dark outlines were thin, and my white lines too much toned, and we set at once to work to correct these defects, inserting outlines of half an inch in width, with the new black among the dark colors; and among the light colors we inserted very pure white drawing lines, or separating lines, especially where a blue and a red of the same tone were in juxtaposition. We also withdrew a great deal of bright gold and inserted dull. The effect was magical and fully rewarded the labor it obliged — for a labor, indeed, it was — and you will understand it when I tell you that so hard had the intonaco become that a mallet and chisel had to be made use of to remove each single *tessera* which had been laid into the wet intonaco, now, after the lapse of time of a little over a month, become as hard as flint.

I made up my mind, once and for all, that during winter as well as summer we would work *in situ* and not any more fumble away at such child's play as executing a decorative work away from its conditions of environment, a practice I believe to be quite fatal to successful decoration, and involving considerable loss of time and expenditure of energy, because, if the artist is conscientious, he is quite certain to feel himself bound, practically speaking, to re-execute the greater portion of his work, so that it may take its relative place among the objects, of which it should be one, and to which it must bear relation. The practice of painting the decoration in the studio and clapping it upon a wall, differently lighted and differently influenced by the character of architectural mouldings and surroundings is a mistake. I defy any artist, even of the greatest experience of decoration, to calculate his effects so minutely in a well-lighted studio so that his work shall appear in its proper relation to the objects which should be at once a part of it when placed in an entirely different lighting, and all the conditions of its environment are totally changed; nor do I think that anything but the roughest sketch for color is desirable for the cartoon. Although every boundary line between shadow and shade, shade and light, should be very clearly defined, because the transposing from one

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material to another involves changes that can only be made under the eye of the artist himself. It is true that he can calculate roughly for the modifications a necessary part of transposition, but the more delicate modifications, which are the life and soul of success, he can only make when actually working in the material that is ultimately to produce his design; and for this reason it is necessary that the artist should be constantly upon the spot, watching the translation of his design from one material into another, whenever he cannot himself execute it. If he is not inclined to do this his work is sure to suffer, for, however clever the workmen may be, not one of them knows really what is the effect the artist has in his mind and which he desires clearly to render. We know by experience how, in a small way, pictures painted in a well-lighted studio totally change in appearance even when exhibited in a well-lighted gallery from what they were in the studio. And if this be true of an isolated picture, that it receives such a curious impression from its surroundings as to be scarcely recognizable as the same work under different conditions, how much more must the same law apply to a large scheme of decoration.

In the work which has been recently uncovered I believe that most of the faults which I have confessed to exist in my previous efforts have been overcome. At the same time we are all learning: every day of experience brings new light upon our beautiful art; and while one can never expect to attain perfection, I have no doubt that every fresh adventure will be more successful than the last. The confidence of the public, as well as the kind manner with which our labors have been received by the press, stimulate us to fresh exertions for the public's instruction and delight.

So we have gone on from space to space, learning and, I hope, improving, until now more than two-thirds of the choir are complete; and if all goes well I shall have the honor next Easter year to show to the English public a complete scheme of decoration, carried out and fulfilled by English workmen upon a scale second to none in Europe. A new art acquired, a new craft learned and its difficulties conquered.

And now a word from the ethical point-of-view.

In a moment of decadence in literature and in certain forms of art, we are told that art for art's sake is alone to be permitted. Surely that is a very dangerous axiom. In the best times of art, whether in early or recent pagan times, or early or recent Christian times, religion has been glad to accept the services of art to give substance and reality to her mysteries.

The morality of art, the impulses which draw her to choose the noblest events in the history of the world as texts wherein to lay her gold and silver, her color and her jewels, are aided and strengthened by that consecutive stream of sacred thought upon immortal themes that have exercised man's intellect and feeling even from the prehistoric ages until now.

It is not for us to lay aside such restraints upon our fancies, and such purifying motives which are induced, by illustrating upon the walls of our churches for the use and service of all, in a moment when materialism of many gross kinds is poisoning literature, art and the drama.

Let us have the best art in our churches that can be obtained, and let the walls of the houses of God be the sacred picture-galleries, free for our people, where they can learn nothing but good, by seeing beauty and purity attired; where they can read the old stories of the childhood of the world; where they can be refreshed, mind and body, by the study of the beautiful; that beautiful, which, to be perfect, must unite the material and the spiritual.



AUSTRALIA.

WOOD-PAVING IN SYDNEY. — ELECTRIC CAR-LIGHTING. — STAGNATION OF BUILDING. — DEATH OF E. A. JOHNSON, PRESIDENT R. V. I. A. — THE GOVERNMENT HOUSE AT MELBOURNE.

SYDNEY, N. S. W.

COLONEL BELL, the United States Consul here, has just published a pamphlet for distribution in Europe and America, on the "*Street-Paving of Sydney.*" He considers that our streets are better paved than those of any city in the United States, except Washington. "The chief streets of Sydney," he writes, "are paved with blocks cut from Australian timber, and they excite the surprise and admiration of all strangers, especially Americans." Their excellence he attributes almost entirely to the merits of the material used in their construction, and he thinks they combine nearly all the qualities requisite in a perfect street, viz, noiselessness, healthfulness, cleanliness, easy traction, cheapness and durability. Colonel Bell has travelled much, and he is evidently keenly observant. Such praise, therefore, coming from one who holds such a high official position should carry conviction, even if it should seem to have a leaning towards flattery. If the pamphlet only tends to bring about some reciprocity in the timber trade between Australia and America, it will have served an admirable purpose, and the result will mutually benefit both countries. Despite the very depressed state of industries generally and of the building trades in particular, in 1893 — the statistics for last year are not available — nearly £350,000 worth of timber was imported into New South Wales alone, and it is safe to say that a large proportion of this amount went into the pockets of American timber-merchants. On the other hand, the total value of the timber exported from the whole of Australia, during the same year, amounted to something less than £200,000, and this amount, too, principally the result of the intercolonial trade, very little timber at that time being exported to foreign countries. The Australian hardwoods are, nevertheless, among the finest in the world, and the supply is practically unlimited. They are now, evidently, becoming better known in England, as an order for 600,000 feet, to be delivered monthly, was lately received by a large shipping firm in Sydney.

But it would seem that it is not only in the matter of pavements that Australia is ahead of America; and, strange to say, an American again proclaims our superiority. Major Pangborn, President of the World's Transportation Committee, on being interviewed lately in Melbourne, expressed his admiration for the manner in which the South Australian Government had succeeded in applying electricity to the requirements of their railway system. He said: "On the South Australian railways they have got a system of electric lighting that is better than anything we have seen anywhere else in the world. They have succeeded in working their electric lighting on the cars by means of a dynamo run from the axle. We, in America, do it by a dynamo run from the engine, and worked by steam. But our plan, you see, takes steam from the engine, and so lessens its power for actual work. In South Australia this is avoided, and the motive power of the revolving axles, which would otherwise be lost, is employed to work the dynamo. It is simply splendid. And that is not all we learned about electric lighting on trains in South Australia. It is a wonderful system of electric accumulation they have there. On the train from Adelaide to Broken Hill, for instance, the journey being at night, the electric lights are on all the time. Well, on the way back from Broken Hill to Adelaide, this journey being in the day, electrical energy is being stored up, and enough is stored to light the train on its return journey from Adelaide to Broken Hill, without any electrician being in attendance to look after it, so that they save the expense of an electrician every second journey they make. Lighting by electricity on this system is actually less expensive than kerosene, and the light they get is the best light I ever saw on a car."

Generally the enterprising American when he honors Australia with a visit, has hitherto only applied himself to the discovery of our failings; it is, therefore, soothing to think that in some things, at least, we are now able to compel his admiration.

The building of the Mutual Life Insurance Co., of New York, is approaching completion, but beyond this there is nothing of any importance in the architectural way being done here. This building and that of the Equitable Life, recently completed, are magnificent monuments to American enterprise, for they are without doubt the finest office-buildings yet erected in Australia. In Melbourne there is absolute stagnation in the building trade, and the same state of things exists in all the other colonies. Architects have little else to do but live — or rather exist — in hope; and they do not find the occupation lucrative.

A proposal has lately been made by the South Australian Society of Arts to bring about the Federation of Australian artists — including architects. The project is being taken up warmly, and is likely to be soon brought to a successful issue. The idea was probably suggested by the arrangement which has lately been effected by the Trustees of the New South Wales, Victorian and South Australian Art Galleries with reference to the periodical interchange of pictures. The arrangement is such that each colony lends twelve of its representative works to the other two colonies for a period of six months, and receives twelve pictures from them in return. The second interchange has just taken place, and the system, so far, has proved wonderfully popular.

The death of Mr. A. E. Johnson, F. R. I. B. A., President of the Royal Victorian Institute of Architects, took place very suddenly at the end of last May. He read an interesting paper before the members of the Institute on the evening of the 28th, and the following morning he dropped dead as he was about to enter a tram-car on his way to his office. Mr. Johnson was for a long time Architect to the Public Works Department of Victoria, and he afterwards became a member of one of the principal architectural firms in Melbourne, who are favorably known in connection with the erection of some of the most important buildings in the Victorian capital.

I am reminded in speaking of Victoria of a somewhat humorous paragraph which appeared under the head of "Notes and Clippings" in the *American Architect* of April 25, 1895, the paragraph in question being taken from the *Philadelphia Press* and is to the effect that Government House, Melbourne, is the counterpart of the Queen's residence at Osborne. The similarity is accounted for by the *Times'* titled correspondent in this way: The Secretary of State for the colonies in London disapproved of the architect's original design, and asked for something like Osborne, which happened to be the first picture his eye lighted on when the aforesaid architect submitted "a book of designs." There are only a few trifling errors in this paragraph. The building was designed in the Public Works office, Melbourne, when the Architectural Department was presided

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over by W. W. Wardell, F. R. I. B. A. The Secretary of State for the colonies could never have seen the design; at any rate, he had no more to do with it than he might have with the selection of a design for the Capitol at Washington. The rest of the paragraph is true.

John Barlow.

TWO SPANISH PHILANTHROPISTS AND THEIR WORK.



Statue of the Marquis of Pontejos, Madrid. San Marti, Sculptor.

THERE is in Madrid an institution, called "Monte de Piedad" and "Caja de ahorros," that has a double object; on one side it lends money to those who are in want of it, and who leave as a warranty, jewels, clothes, etc., and on the other side, pays an interest to those who deposit in it the money that is thus loaned. That is to say, with one hand it takes money, and with the other lends it to needy persons.

This institution was the result of the fusion of two component parts; the first was established by a priest, named Piquer, at the commencement of the seventeenth century, and the other at the beginning of the present century, by the Marquis of Pontejos.

The priest Piquer was born on October 4, 1666, at Valborne, in the province of Teruel, and died at Madrid, September 13, 1739.

Having read and heard much about the Italian "Monts de piété," he conceived the idea of establishing one in Spain, that would surpass those he knew of by reference, wishing to conciliate many difficult extremes, such as succoring public necessities and combating usury.

He gave ostensible commencement to the practice of his purposes on December 3, 1702, that is to say, on Saint Francis Xavier's saint-day — he had a profound esteem for this saint — he fixed on the wall of his room and at the feet of an image of the Virgin, a little box; he called all the persons that lived with him, and putting a silver piece of money into the box, he said to them, "Be witness that this small silver money that I place to-day in this box will be the beginning and the base of a 'Monte de Piedad,' that God will protect for the suffrage of souls and help of living."

The box began directly to produce many alms, and although there was a great opposition to the placing of these boxes in the parishes, the common people protected them, so much that in 1704 the priest Piquer had placed 137 boxes, which produced 1,195 pesetas, and in 1705, he distributed 212 boxes and gathered 2,055 pesetas.

With these resourses always increasing, with the sale of numerous examples of a book that he wrote, entitled "*The Screams*," and with the profit that accrued from sums of money with which private gentlemen intrusted him in kind of deposit, he not only paid very many offerings for the profit of souls, but also was able to celebrate sumptuous novenaries, and to extend loans with sure warranty to needy people, without any other condition than the praying — never compelling — the persons who redeemed the pawned objects, to contribute with some charity in favor of the souls.

Taking jurisconsults, canonists and other learned people as counsellors, he arranged a series of statutes, so as to organize a Monte de Piedad, under the patronage of the King, and although the ecclesiastic government of Toledo was very averse to the priest's idea, he found a true protector in the renowned Cardinal Portocarrero; but unhappily for Piquer, his good protector died on September 13, 1709, before being able to obtain a satisfactory decision.

Nevertheless, he put in practice his project and on January 3, 1719, the first General Council was convoked, and Piquer presented the accounts of deposits and loans from 1711 to 1719. He also solicited and obtained by Royal Schedule, dated October 6, 1723, that 17,500 pesetas per annum should be granted to him out of the revenue from tobacco, so as to be able to pay the indispensable placemen.

In the council that took place on February 15, 1724, the proposed nomination of the high commissioners, clerks, etc., was approved, and May 1, of the same year, the offices, completely arranged, were opened to the public, after twenty years of anxiety and sundry vicissitudes.

When these offices were opened in 1724, the Institution, including notes more or less payable, had 139,076 pesetas; in 1730, it surpassed 290,000, and in 1739 — the year in which Piquer died — it nearly reached 375,000 pesetas.

On August 4, 1888, the conditions for the erection of a statue in bronze to the memory of Piquer were published, and in February, 1889, the prize for this statue was granted to Mr. Joseph Alcoverre.

Piquer in this statue is clad in his sacerdotal habit; with his left hand he is gathering some papers that represent his series of statutes, and his chin rests on his right hand, as in attitude of pondering on the studies and details that preoccupied him while arranging the establishment of the Monte de Piedad. The idea is in congruence with the lemma that the author of the statue employed when he presented his design: "*And God heard him.*"

In one of the squares of the pedestal, there is a bas-relief that shows Piquer at the moment that he is putting the little silver-piece in the box, on December 3, 1702.

THE MARQUIS OF PONTEJOS.

Joachim Vizcaino, Marquis of Pontejos, was born in the Province of Corunna, August 21, 1790. He was a very studious man. Having visited the principal capitals of foreign nations, he gathered a great deal of information that enabled him to introduce in his native country the improvements that he thought necessary for its material and intellectual progress, and principally all that could be favorable to the poor.

In 1838, he was appointed Governor of Madrid, and after enormous difficulties he obtained the creation of a *caja de ahorros* (savings-bank) for the benefit of the necessitous, and also the passage of a by-law that resolved that it should be established in the same building that was occupied by the "Monte de Piedad," and should be devoted to money placed on deposit.

This institution was opened to the public February 17, 1839, and immediately the people hurried to it to deposit their money, and thus the Monte de Piedad was enabled to give a great impulse to its business, for while in 1837, it only succored 10,837 persons with 379,000 pesetas, in 1839 it made 18,000 loans with 1,290,000 pesetas.

In 1869, the fusion of the two institutions, "Monte de Piedad" and "Caja de ahorros" took place, so as to constitute a single unique beneficient establishment and thus were obtained so many and such good conclusions, that from that moment it was decided to honor the memory of the Marquis of Pontejos by a raising to him a statue. This was made by the artist, Señor Medord San Marti, and it represents the Marquis in a haughty aspect, grasping with the right hand a book that images his scheme of the care of savings and a commander's staff, symbol of his authority as Governor of Madrid. On the top of various attributes there is a money-box that signifies the savings-bank (*caja de ahorros*) in which the workman, trader, etc., deposit their economies, that in the fullness of time will help them in the vicissitudes of life, when work is not to be found, when an illness happens, for repose in old age, so as to create an independent position, or to endow with a fortune, or to favor in any other way the beloved members of their families.

In the month of December, 1891, 120,242 loans had been made on jewels and clothes, amounting to 8,378,603 pesetas, and 1,066 loans on public values that amounted to 40,369,903 pesetas; the first paying an interest of six per cent per annum, and the second four per cent per annum.

The books of the "Caja de ahorros" showed at the same dates 41,610 depositors, with a capital of 48,741,440 pesetas.

The establishments count a capital of 4,764,892 pesetas, that can be considered as reserve, and 3,328,936 pesetas, which is the value of the three buildings that belong to this beneficent institution.

Mariano Belmas.

SWITZERLAND'S BUILDING-MATERIAL STATION.[1]

THE federal institution for the testing of building materials is placed under the direct supervision of the Federal school board, which is continually kept *au courant* of the management, the requirements and the results of examinations made at the station by a special commission selected from among the school-board. A technologist, appointed by the Federal Council upon the recommendation of the school-board, is charged with the superintendence of the station, and he performs the respective tests with the assistance of the necessary permanently-employed force.

The object of the institution is to ascertain the general utility of

[1] A branch attached to the Federal Polytechnic School at Zurich.

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building materials, especially as to their cohesive power, in compliance with requests made by private parties or authorities; in addition thereto, it makes, of its own accord, tests and examinations of the same nature, which, in a general scientific and economic way, are of public interest.

In this institution, every kind of building and constructive materials is tested, but particularly natural and artificial building-stones, cements, timbers, metals, hemp and wire cables, chains and driving-belts, as well as completed constructions — parts of machinery or bridges — to ascertain the quality of materials, their elasticity and absolute strength. The station furnishes also chemical analyses of all these materials.

Requisitions from private parties, or from authorities desiring building materials tested and examined, are to be addressed in writing to the superintendent of the station. The latter shall immediately respond to the party making the request and execute orders as promptly as possible, according to the date on which the request was received. Should the employés or the machinery of the institution be overtaxed with work and the execution of an order require a period exceeding four weeks, the parties interested shall be so notified. The materials to be tested must be delivered to the station free of all charges. Expenses resulting from improper preparation or damages to materials while in transit are, in all cases, to be borne by the owners. The station provides the necessary tools, implements, etc., free of all charges, except the apparatus which may be necessary for testing exceptional materials, which are only rarely called for. In such case, the party in interest must pay whatever extra outlays are required. If such special apparatus can, thereafter, be of use to the station, the latter may pay part of the expenses, which, however, are not to exceed 50 per cent of the original cost, and it must then become the property of the station. The fee for any test has to be paid in advance. In case the fee has not been previously fixed, an approximate amount must be paid, and, whatever the balance, it can be settled after the test is made. To annual subscribers, a lower fee is charged.

The results of all the tests made are recorded, and a copy of the record, in the form of a certificate, is given to the patrons. This certificate must only state the results of the test, without mention of the purposes the material in question is to be used for. The superintendent is not allowed to give any verbal or written information regarding the tests to outsiders, unless he is specially authorized to do so by the party in interest. Results of tests will, however, be published in the general reports of the station, if the interested party does not object thereto, within four weeks after the receipt of his certificate.

The superintendent of the institution is in duty bound to make full annual reports to the school-board relative to the work done and the results obtained by the station. He shall also, from time to time, publish special reports on the results of special interest, defining the same as "reports of the building-material control station of Switzerland, at the Federal Polytechnic School, Zurich."

The tests of building timbers are:

1. *Complete examination.* — Indication of run of fibres, number and condition of knots in longitudinal cuts, determination of the average width of the annual layers, and of the modification in the width of the annual layers in a latitudinal direction of the structure; composition of the lineal layers, as well as the average proportion between spring and fall woods; determination of the degree of moisture, the density at the time of delivery and after being subjected to a temperature of 105° Celsius, the unit volume weight; determination of elasticity and resistance to traction and to compression, to trimming and to flexion; construction of the diagram of the resistance to flexion, and of the flexion work corresponding with the characteristic modification of the substance. The quality of material and the kind of preparation necessary for the trial pieces are prescribed in special regulations. The fee for one examination is 200 francs ($38.60).

2. *Restricted quality examination.* — Determination of resistance to compression and flexion, construction of the working diagram of resistance to flexion. The material required for examination are three prisms, with sharp angular edges and planed surfaces, 12 by 12 centimetres (4.72 inches), in sections of 160 centimetres (63 inches) in length. The fee for one examination is 60 francs ($11.50); the subscription fee for five examinations is 180 francs ($34.74).

3. *Special examinations according to agreement made in each case.* — Each shipment of wood should as nearly as possible be accompanied by the following description: (*a*) An exact denomination of the kind of wood; (*b*) statement of the age and time of felling; (*c*) statement of origin and the condition of the land on which grown (if on south or north slopes, elevation above the sea, if from the interior of the forest or from the outside borders, etc.); (*d*) geological condition of the growing land (if moraine, sandstone, lime, argillaceous schist, or slate, etc.). EUGENE GERMAIN, *Consul.*

ZURICH, November 9, 1894.

LONGEVITY BY STORIES. — A Hungar, an hygienist, recently investigated the effects of different stories on the length of life and found that the dwellers of cellars lived about 39 years and 11 months; those on the ground floor to 43 years and 3 months; those on the first and second floors lived to 44 years and 2 months, while those on the third and fourth floors only to 42 years. — *Boston Herald.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE HARVARD CLUB-HOUSE, W. 44TH ST., NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print issued with International and Imperial Editions only.]

ELEVATION AND PLANS: HARVARD CLUB-HOUSE, W. 44TH ST., NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

FIRE-ENGINE HOUSE, BATH BEACH, N. Y. MESSRS. PARFITT BROS., ARCHITECTS, BROOKLYN, N. Y.

A DUPLICATE of this structure is also building at Blytheburne.

DESIGN FOR A VILLAGE CHURCH. MR. J. W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

COMPETITIVE DESIGN FOR CITY-HALL AT COHOES, N. Y. MESSRS. WALKER & QUIMBY, ARCHITECTS, NEW YORK, N. Y.

HOUSE FOR A. L. PLIMPTON, ESQ., WEST ROXBURY, MASS. MR. E. L. CLARK, ARCHITECT, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

ENTRANCE-HALL: HARVARD CLUB-HOUSE, W. 44TH ST., NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

STAIRCASE OF THE SAME.

[Gelatine Print.]

BILLIARD-ROOM OF THE SAME.

[Gelatine Print.]

DETAIL OF ARCHWAY, TEMPLE GARDENS, LONDON, ENG. E. M. BARRY, ARCHITECT.

PROPOSED COTTAGES, WEST BRIGHTON, ENG. MR. G. M. JAY, ARCHITECT.

VILLA FOR T. G. HEAD, ESQ., STOURWOOD, BOSCOMBE, ENG. MESSRS. DANCASTER & TAYLOR, ARCHITECTS.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THEODORIC OR THEODOSIUS?

1040 DREXEL BUILDING, PHILADELPHIA, PA., July 15, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In an editorial in your last issue, in noticing M. Charles Lucas's translation of the instructions given to architects by "Theodoric, King of the Goths," through Cassiodorus, his secretary and counsellor, I find some discrepancies between the version of M. Lucas and that of an earlier writer.

M. Lucas names two architects, Aloisius and Daniel. In the "*Architectural Director or Pocket Vignolia,*" written by John Billington, architect, and published about 1845 — the date of publication not being in the edition that I possess — the letter referred to is given entire with the following heading: "Nothing can give us a higher idea of the esteem enjoyed by the architects of antiquity than the letter of the Emperor Theodosius to the Architect Symmachus, which is here given as Cassiodorus has transmitted it to us." The letter is a lengthy one and contains all the quotations that you make use of, together with some brief allusions to the progress of architecture from the "Cyclops who built in Sicily edifices as spacious as the caverns which they had abandoned," down through

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their posterity, "rivals of those first architects who profited from their inventions and employed them for their necessities and comforts."

The translation of M. Lucas also shows a discrepancy in the name of the ruler under whose instructions Cassiodorus wrote. He is therein spoken of as "Theodoric, King of the Goths"—*temp. c.* 454–526. While Billington speaks of the Emperor Theodosius—*temp. c.* 346–392.

Which of the two versions is the correct one?

Very truly yours, George C. Mason.

EXHIBITIONS

Boston, Mass.—*Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

New York, N. Y.—*Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

An Improvement in Steel Manufacturing.—The Cleveland Rolling Mill Company has just completed a successful experiment in connection with the manufacture of steel, which will save the Company one dollar on every ton of steel, or about $200,000 every year, and will, besides, improve the quality of the finished product very materially. The experiment was a novel one and to the uninitiated mind it must seem audacious. It is, in brief, the transportation of immense ladles filled with molten metal over a railroad used by passenger and freight trains for a distance of five miles. Within an hour after the molten mass has streamed through the tapping-hole of the central blast-furnace it may, if necessary, be in the converter, from which it comes out molten steel. The object of the experiment, which was begun less than a month ago, was a triple one, to save money, to save labor and to improve the quality of the steel. All these objects have been attained and the new method will be used henceforth. The Cleveland Rolling Mill is the third to adopt it, as the process is now in use at the Carnegie Works and the South Chicago Mills. The old method of transporting iron from the central blast-furnace on the flats near the Central Viaduct to the rolling-mills in the South End was a tedious and expensive one. Formerly, when the furnace was tapped and the metal in a molten condition poured out, it was conducted in the runners or grooves in the sand, below to the "pig bed." The "pig bed" consists of a main central groove or trough in the sand, through which the metal runs, and hundreds, or thousands, according to the magnitude of the works, of smaller grooves in the sand below the furnace into which it is conducted and where it becomes cold and hard, maintaining the shape of the groove, becoming what is known as a pig of iron—that is, a block about three feet long and weighing about 200 pounds. In the old way, which is that usually followed, when they became hard, these pigs were broken up, loaded in cars and transported in that way to the mills, where they were re-melted, so that they might be ready for the converter. This necessitated the employment of a number of men to break up the pigs, a number to load them, a number to unload them and take them in barrows to the cupola for re-melting, and it was, besides, a slow process. By the new process, the handling of the pigs of iron at the blast-furnace is saved and also their second handling at the mills; the coke used formerly in re-melting is saved; the waste of metal by the second melting in the cupola is saved, and the metal is prevented from acquiring the sulphur from the coke in re-melting, as well as other impurities which would decrease the amount of the ferro-manganese. The total estimate as approximated by Manager Craig of the mills, is $1 per ton of steel saved, or $200,000 every year, which is no small item.—*Cleveland Leader.*

A Felicitous Phrase.—Sincere thanks are due to Mr. J. M. Tower not only because he wrote to the Police Commissioners and asked them to prevent certain vandals from robbing the Bowery of its three ancient milestones, and thereby showed his intelligent interest in such relics of the past as the city still has to show, and his praiseworthy desire to have them preserved, but because his letter contained a phrase which, in eight words, gave a most admirable and perfectly adequate explanation why all mankind should, and why a large portion of it does, regard things like these old milestones as of great value and is deeply pained whenever one of them is destroyed. Misguided people are accustomed to bring forward mere age as a reason for guarding antiquities of various kinds long after they have ceased to serve any obviously practical purpose, and often after they have become something of a nuisance. Age in itself, however, is never venerable, and the other arguments of archæologists in defense of their passion for ugly and musty reminders of the days that are gone are rarely any better founded than this one. Mr. Tower, on the contrary, goes straight to the question's heart when he says of the milestones—and, by implication, of everything else of the same sort—"these give variety to one's thoughts in passing." What finer, or truer or more concise statement of the case could be made? It both explains and justifies, for the first time perhaps, the whole science of archæology, and protects forever its votaries from the contempt of Philistines and the sneers of ignoramuses. Whatever gives diversity to thought is of manifest worth, should be tenderly protected from harm, and is entitled to high consideration.—*N. Y. Times.*

Book-stack Shelving.—By common necessity, any architect in active practice is constantly inventing some method or device for accomplishing some constructive adjustment peculiar to the building he may be at work on. Ordinarily these adjustments are of special and not general applicability, and so the architect rarely thinks of covering his invention with a patent. Yet constant practice certainly does develop the inventive faculty highly and it is a little strange that so few patents are taken out by architects. Now and then, however, some thing is devised that promises to be generally useful and is so simple in its parts and so easy of manufacture as to warrant an attempt to put it on the market. This is the case with a very ingenious device for the support and easy adjustment of shelves in fireproof library stacks which has just been invented by Mr. W. M. Poindexter, architect, of Washington, D. C. In its essence it consists of small balanced cams fixed at short intervals in the side edges of the front uprights of the stack supports. To describe it farther would require so many words as to obscure the real simplicity and workability of the contrivance. It is enough to say that it is simple, unbreakable and more easy of manipulation than any similar device for the intended purpose.

The Spitzer Art Sale.—Transatlantic dollars have played a very important part in the sale of the great Spitzer art collection, which has just been brought to a close, the most important sale of its kind during the present century. Among the largest purchasers have been Mr. Riggs and the Duc de Dino, whose money comes to him through his American wife, formerly Miss Adele Sampson, of New York. Their principal purchases have been of mediæval weapons and armor, their collections of which rank among the most important in the world. That of Mr. Riggs, I understand, is destined for his native city of Washington, to which he proposes to bequeath it at his death. The Duc de Dino shares with his intimate friend and associate Henri Rochefort the distinction of being rated among the most perfect connoisseurs in Europe of curios of this kind, as well as of art bric-à-brac, and I often think what a pity it is that the State cannot find some means of turning to public account the unrivalled knowledge and genius which they possess in this particular. What Parisians will do, now that the Spitzer collection has been dispersed, it is difficult to tell. The Spitzer mansion, just off the Avenue du Bois de Boulogne, has, ever since I can remember, been one of the sights of Paris, crammed as it was from cellar to garret with a unique collection of works of art, each article a masterpiece of its kind. I cannot help thinking that, had Gambetta lived a little longer, this collection would have remained with us forever, instead of being scattered to the four corners of the earth. For he was never tired of urging upon fat little Mr. Spitzer, who was the son of a cemetery-keeper at Vienna, to present the entire collection as it stood to the nation, as a lasting and glorious memorial of his name, the fame of which would extend permanently throughout the world. If Spitzer had one failing, it was that of vanity and self-glorification, and it was upon this string that the eloquent French statesman used to harp in order to induce the collector to comply with his suggestions, which I am certain he would have done had not Gambetta's life been cut short so prematurely and suddenly.—*Paris Correspondence of the N. Y. Tribune.*

The Diamond Shoals Lighthouse.—From observations made by the Lighthouse Board it appears that the second attempt to erect a lighthouse on the dangerous Diamond Shoals off Cape Hatteras, N. C., has failed. Just what steps will be next taken to guard the important coastwise traffic against the perils of this place—a veritable graveyard of ships—has not been determined. The shoals lie off Hatteras about ten miles, and in bad weather when aids to navigation are most necessary, the powerful Hatteras light is unable to cast its warning beams far enough out to sea to guard against disaster to ships. Some years ago the Lighthouse Bureau, obtaining a large appropriation from Congress, made a contract with an experienced firm of lighthouse builders to erect a lighthouse on these shoals. The plan of construction was to sink vast cylinders of heavy boiler-iron down through the water and the many feet of shifting sands below to bed-rock. These cylinders were to be filled with concrete and made practically a solid rock upon which the lighthouse was to be erected. The contractors took the job at their own risk, but after making several expensive attempts they threw up the work. Last year the Lighthouse Bureau undertook the work itself, this time on a new plan. This was based on the use of heavy iron piles driven by hydraulic jets deep down in the sands, through which the seas were to be allowed full sweep, while the lighthouse perched far above the waters on top of the piling. A few weeks of fine weather last Fall enabled them to put in a quadrangular pyramid, upon which a superstructure was erected, and at this point the Fall storms came along and the work was suspended for the year. But when an inspection was had recently, preparatory to resuming the work, it was found that the great waves had played havoc with this structure. Nothing remained of the superstructure and the piling that stood was twisted into cork-screws. The effect of the surges on the ironwork was sufficient to convince the inspectors that no structure of the kind could stand against it. The piles appeared to remain firmly in the sand at the bottom, but at the surface where they received the full force of the waves they were carried away and could not be maintained by any device. So the Diamond Shoals Lighthouse is still a problem for engineers. The difficulties which thus far have been encountered far exceed those overcome in the case of the celebrated Eddystone Light.—*Philadelphia Press.*

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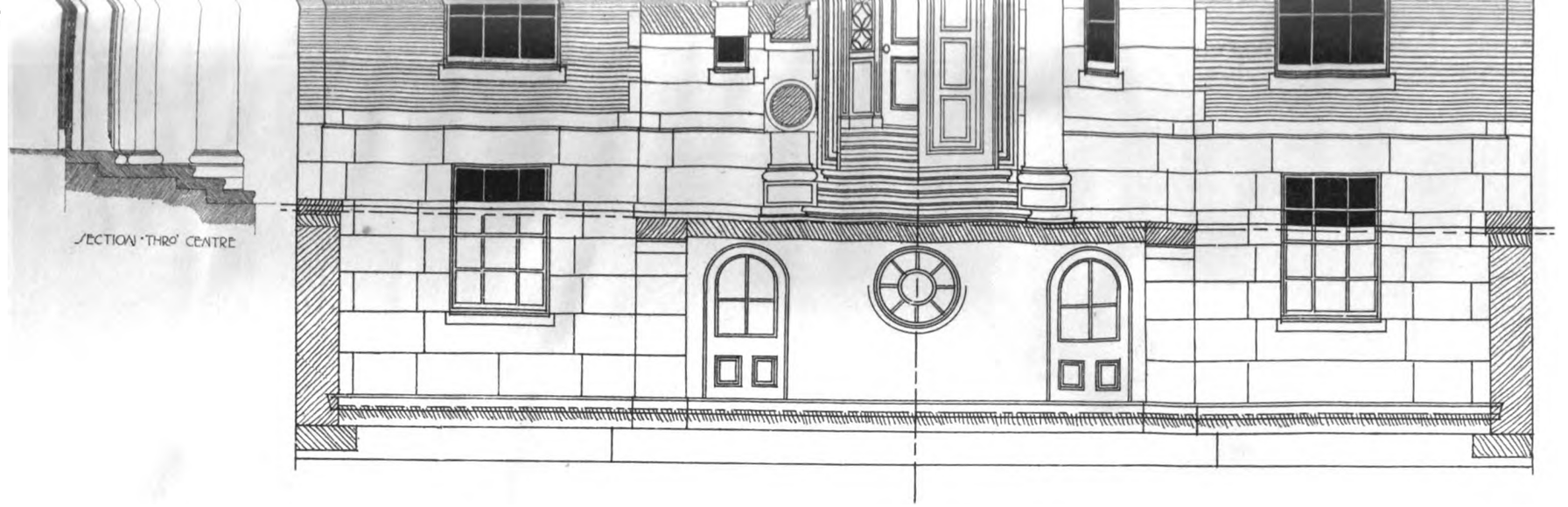
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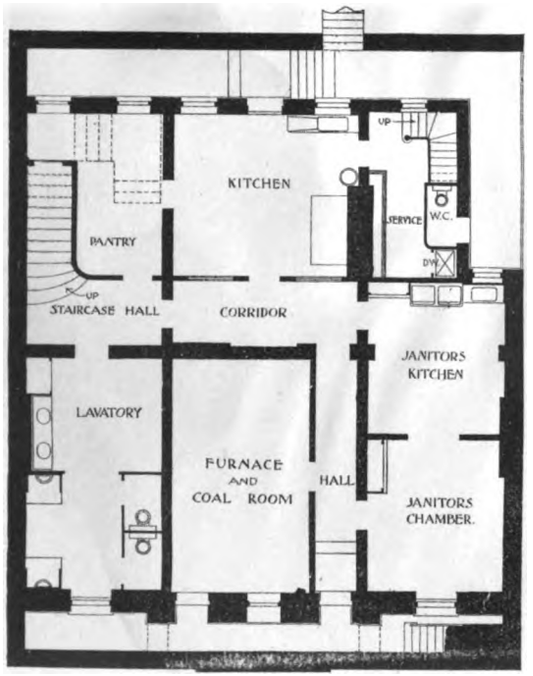
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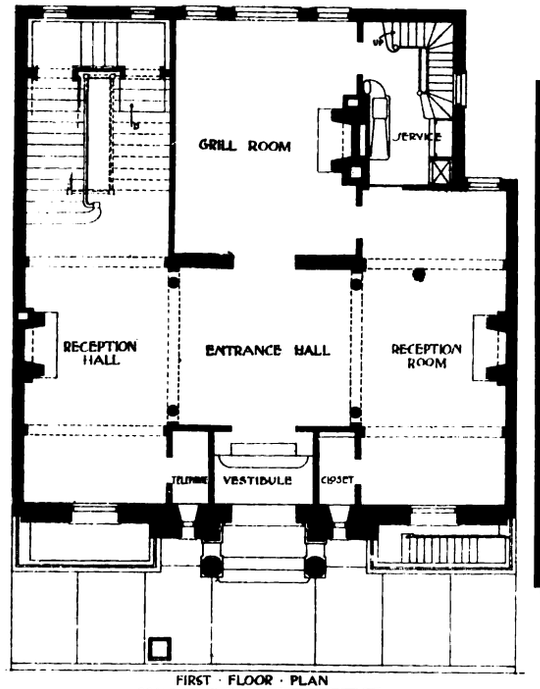
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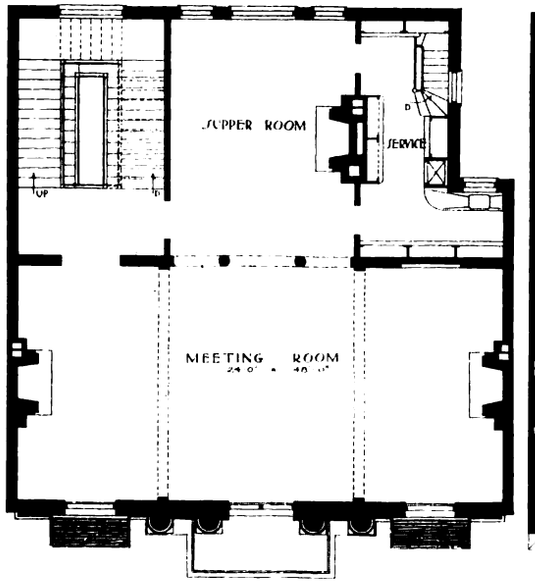
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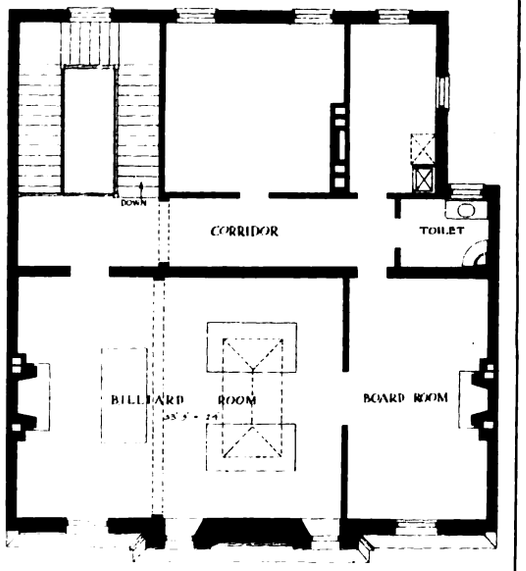
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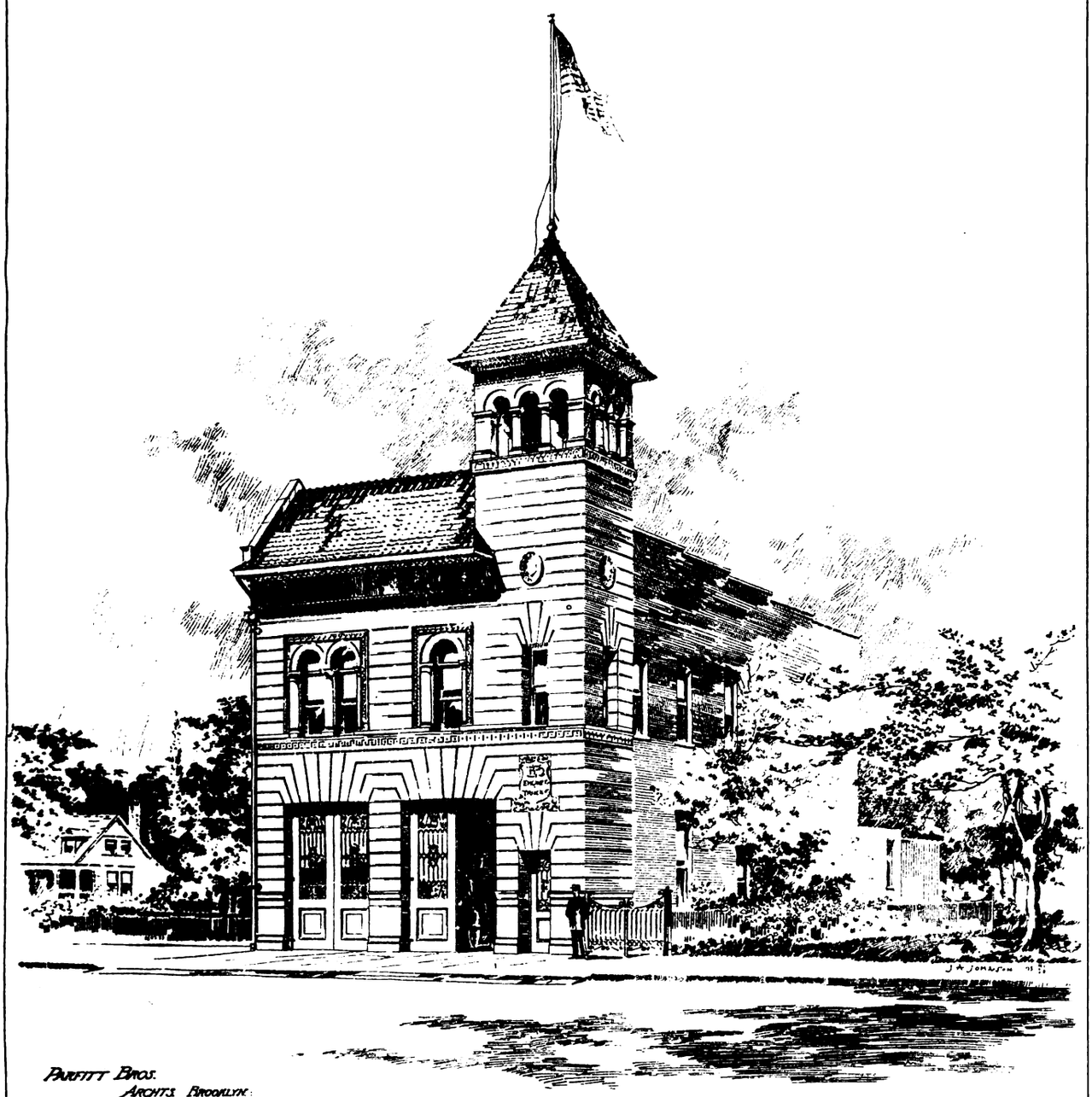
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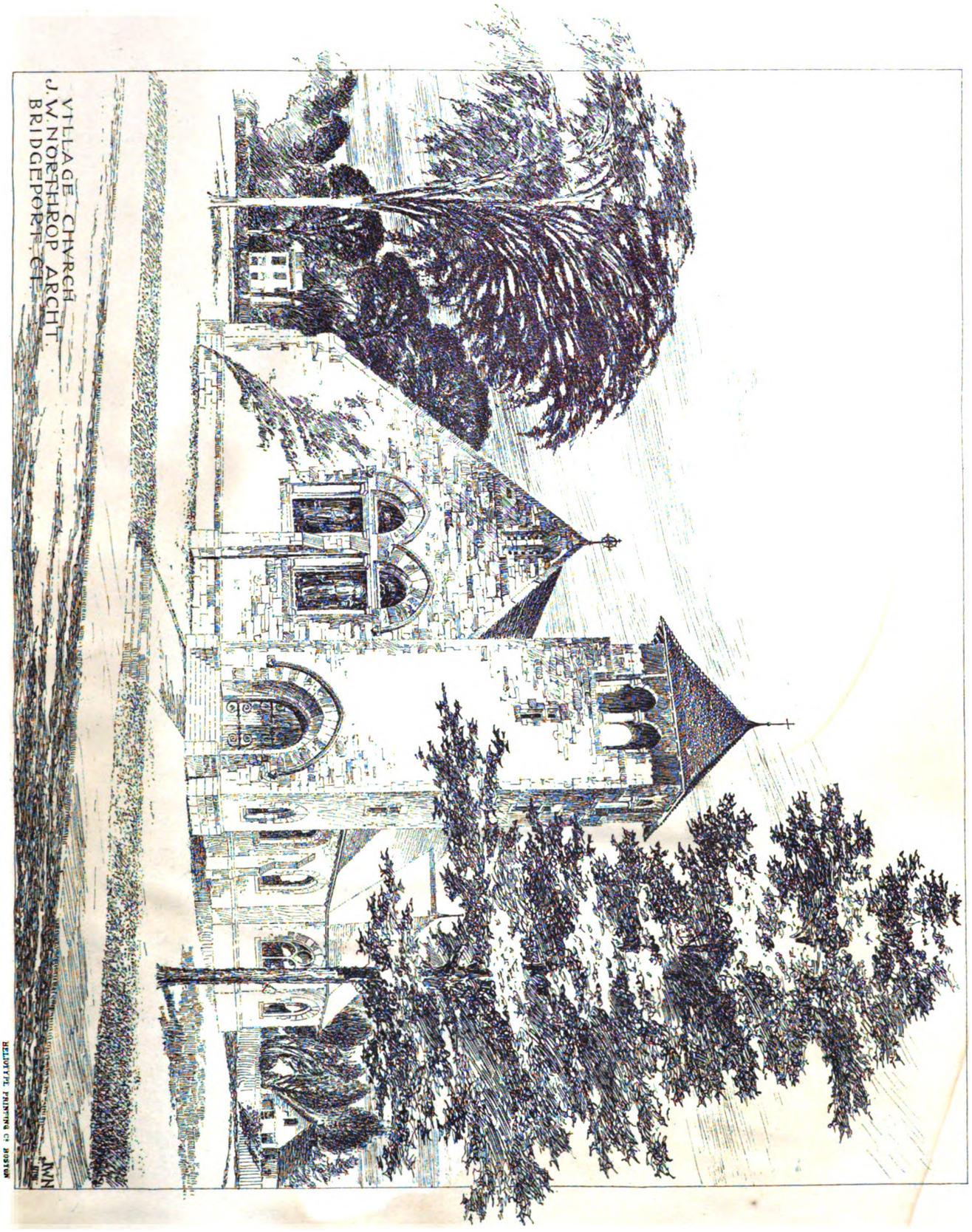
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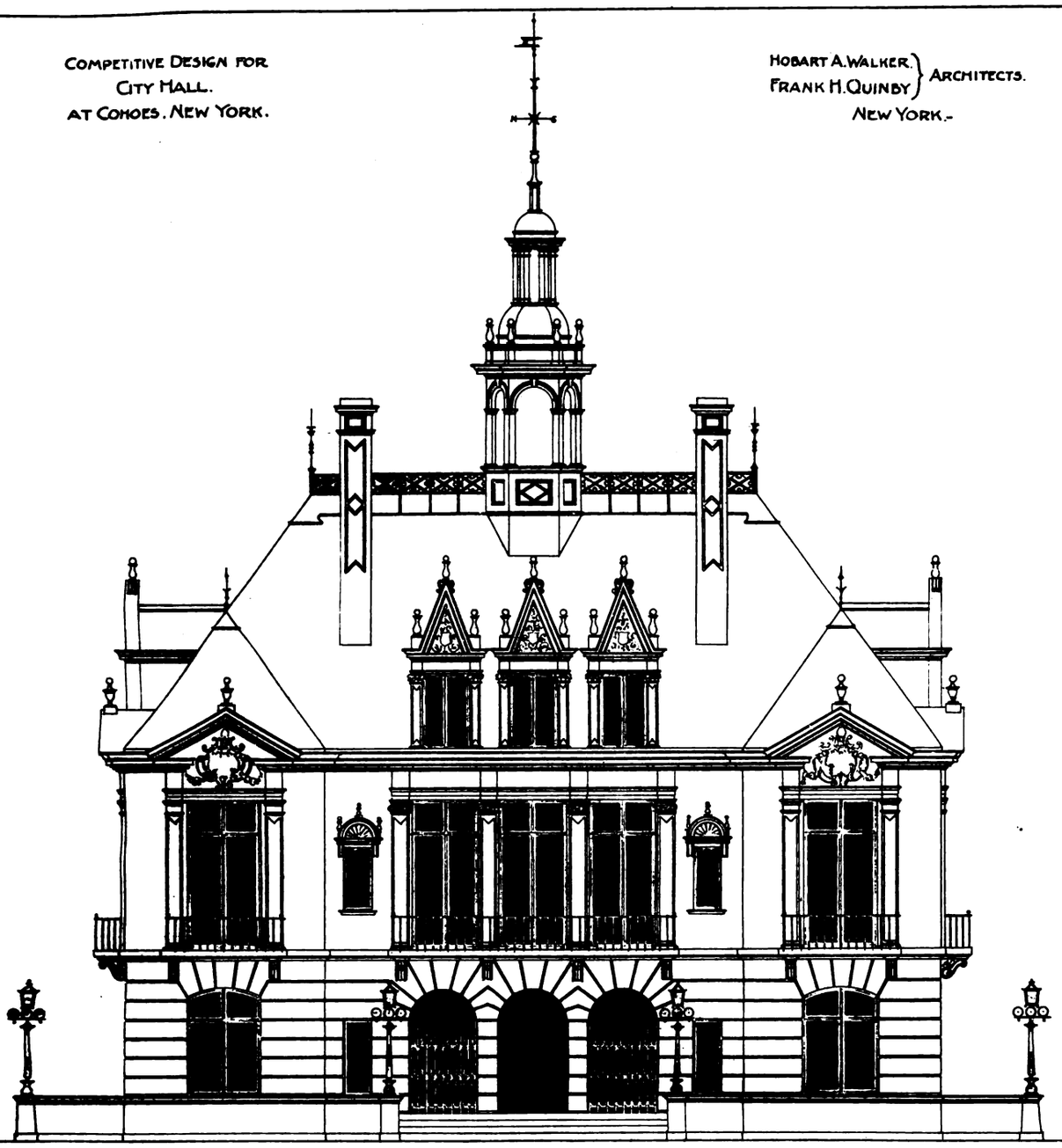
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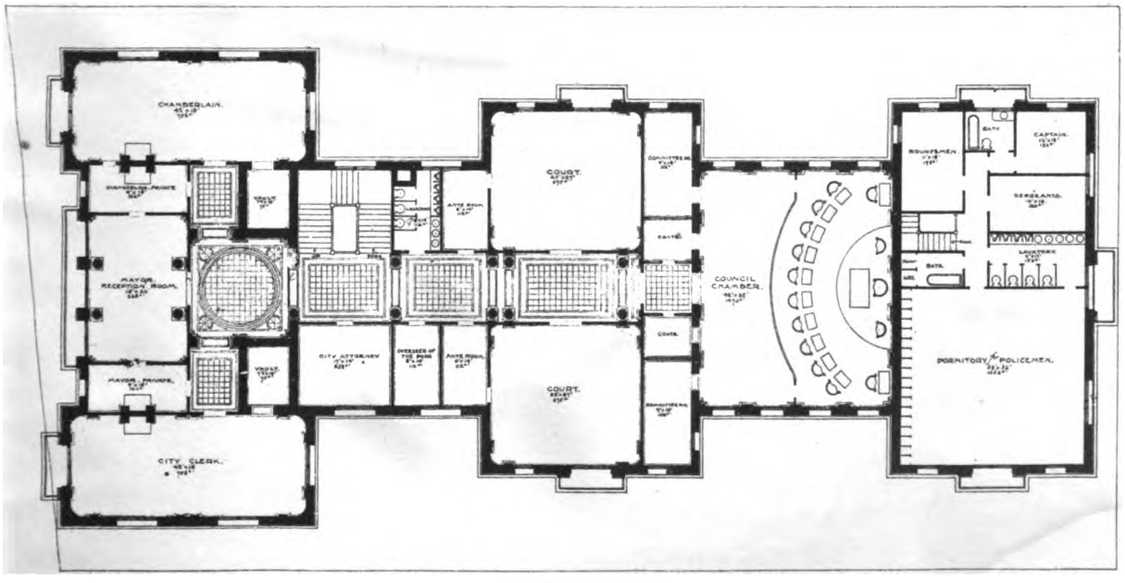
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PLAN OF FIRST FLOOR

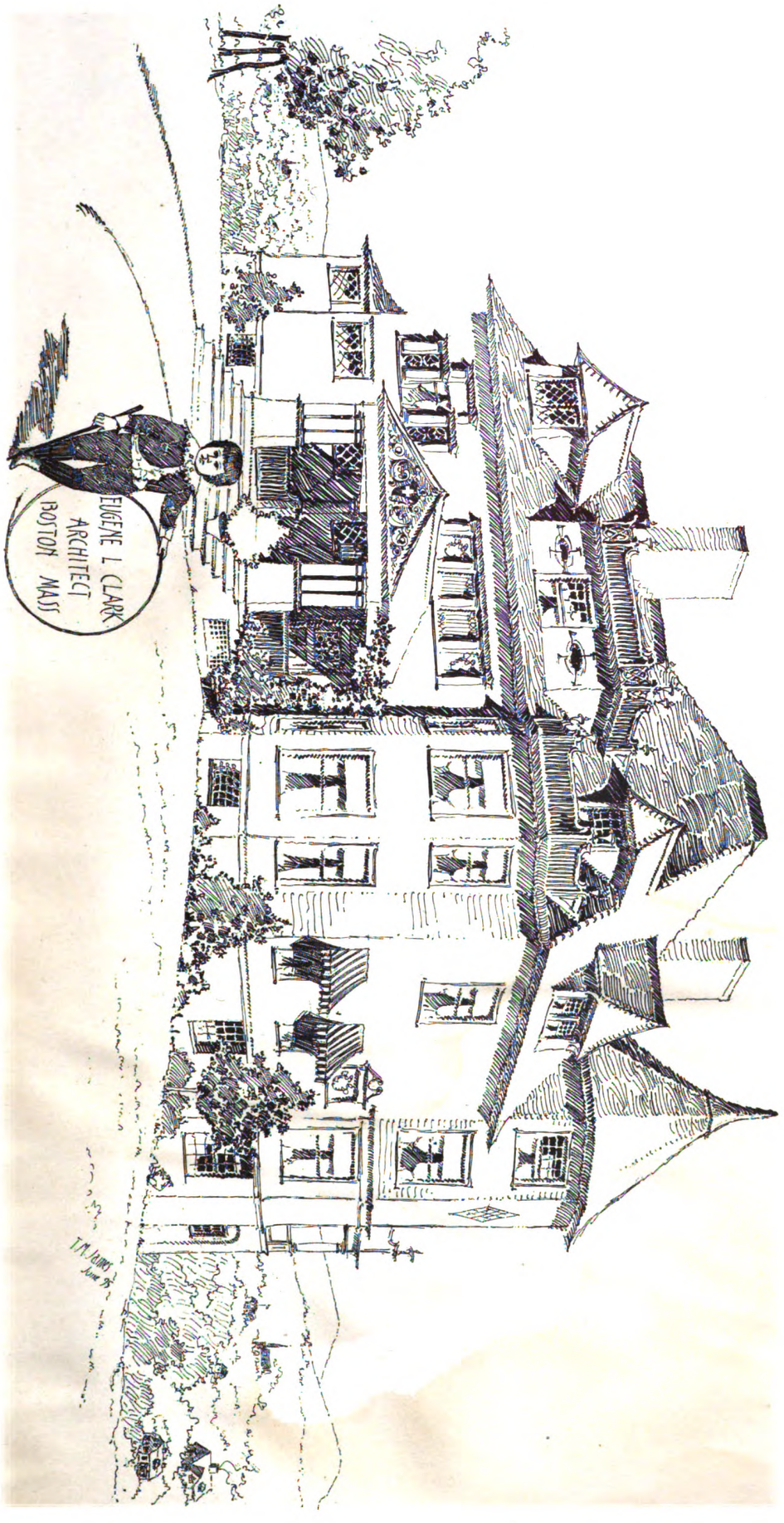
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JULY 27, 1895.

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AN interesting piece of foundation-work has been going on in New York, at the corner of Exchange Place and Broad Street, where a sixteen-story office-building is to be erected for the John Taylor Johnston estate. The soil at this point is a stiff clay, mixed with gravel and boulders, and resting on rock, at a distance of about forty feet from the surface. As usual in New York, where such lofty buildings are to be erected in the lower part of the town, caisson foundations are used, but the method of sinking the caissons is novel. Instead of forcing air into them, so that the earth can be excavated under them, the work of sinking them is performed mainly by water-jets, directed in a very ingenious manner. Around the lower edge of the caissons, which are of the usual form, and proportioned in size to the weight which is to come upon them, are fixed hollow castings, each of which is pierced with a row of holes, about one-eighth of an inch in diameter. Pipes, descending on the outside of the caisson, enter the castings, and convey to them water, at a pressure of a hundred pounds or more to the square inch. The water issues in jets from the holes in the castings, washing away the earth from under the edge of the caisson. Around the lower edge of a caisson of moderate size there are something like a thousand of these jets, and their combined effect loosens the earth so effectually as to allow the caisson to sink rapidly. The movement is hastened by loading the top with iron weights, and by exhausting the air from the interior; and it is said that a caisson can be sunk forty feet in about a day, including all the delays incident to testing and rectifying the movement, and riveting together the three sections of which each caisson is made. As might be expected, the sections do not sink with perfect accuracy, and the work must be stopped at intervals to apply gauges, and modify the current through the water-jets, until the necessary correction is made In most cases, this is all the rectification required, but when the descending edge of the caisson meets a large boulder, it is sometimes necessary to apply a special treatment, which consists in directing a jet of water upon the earth below the boulder, and a little outside of it. This jet soon excavates a hole, into which the boulder falls by its own weight, out of the way of the descending caisson. After the caissons are sunk to the rock, they are excavated in the usual manner, the surface of the rock trimmed and levelled if necessary, and concrete and masonry put in, filling them to the top. As soon as the concrete has set, the foundation is ready to receive the superstructure. As usual with modern caisson foundations, the steel cylinder is intended to serve only as a form in which to mould the concrete pier, which is the real support of the building, so that the metal may corrode away at any time, after the concrete has set, without diminishing in the least the security of the structure. Compared with the older method of making caisson foundations, the new one, which is the property of the Hydraulic Construction Company, has great advantages in point of rapidity, the sinking of a caisson being a matter of a few hours, instead of several weeks.

THE question of repairing the damage done by last year's earthquake to the antique ruins in Athens has come up again. In England, Mr. Somers Clarke, whether from actual examination on the spot, or by study of photographs, we cannot say, is convinced that the Parthenon is in imminent danger of falling, or, at least, of losing some of the portions now standing, and urges his views on the readers of the *Builder;* while, in Germany, the feeling seems to be that nothing is needed but watchfulness, and some unimportant work of consolidation. Herr Drumm, a German architect, who has recently examined carefully all the antique remains in Athens, takes advantage of the present interest in the matter to ask for repairs to some of the smaller structures, which do not appeal to the public so much as the Parthenon does, but which the artistic world would be very sorry to have go to decay. Speaking of the Propylæa, he says that the ruins are in a satisfactory condition, nothing being needed but to root out the grass from the joints, and cover the pavements with some impervious material, so that the water may be drained off, without soaking into the masonry. The temple of Niké Apteros, which was restored thirty years ago, is in a tolerably satisfactory condition, but the upper portion should be protected against rain-water. It will be remembered that Mr. Stillman conjectures that the celebrated statue known as the Venus of Milo may have been the original statue of Niké Apteros (the Wingless Victory), from this temple on the Athenian Acropolis, which is supposed to have been carried away for safe-keeping, and may have been buried on the island of Melos, where it was found. Such objects undergo many vicissitudes, and this very statue was buried again in Paris, by order of the authorities of the Louvre, during the War of 1870–1871, to prevent the Germans from carrying it off; so that Mr. Stillman's guess may be well founded. If so, it is all the more desirable to have the little temple from which it came kept in good repair, for the restoration of the idol to its own house, which would be possible, or even the erection in the sanctuary of a cast of the original image, would be a matter of extraordinary interest, as showing how the Greeks adapted, not only their sculpture to its surroundings, but the surroundings to the sculpture.

LA SEMAINE DU BATIMENT has established a department of "*Notes Techniques*," consisting of recipes and information of all sorts, which bids fair to be extremely useful to architects, who are expected to be able to answer every question that a housekeeper can think of asking. One of its recent notes of this sort tells us how to cure the smell of fresh paint. Every one knows that a house which has just been painted, particularly if much turpentine has been used in the work, is nearly uninhabitable for a week or two afterward. If the windows can be opened, the smell blows away after a time, but *La Semaine's* plan is much simpler. Instead of opening the windows, they are kept closed, and, for each newly-painted room, about four ounces of ordinary sulphuric acid is taken, divided into two parts, and each part poured into a saucer. The saucers are then placed at opposite ends of the room to be deodorized, and the doors closed. In a few hours, the acid will have absorbed and destroyed the vapor from the paint, and, after a thorough airing, the room will be quite habitable. It is understood that we do not warrant the success of this plan, the chemistry of which is to us decidedly obscure; but *La Semaine* is good authority on all such matters, and we can at least conscientiously recommend a trial of it.

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ANOTHER recipe which we find among *La Semaine's "Notes Techniques,"* is one for restoring the color of faded curtains or other fabrics, particularly those with a plush surface. According to this, all that is necessary is to sponge the material with chloroform. This substance has long been used by mammas with enterprising sons, to remove the printers'-ink, wheel-grease, berry-juice and other mementoes of their exploits which the youths bring home on their clothes; but its employment to revive faded colors is to us a novelty. It is hardly necessary to say that the chloroform should be used with great caution. Its vapor forms with air an explosive mixture, so that the work should never be done near a fire or light, while the physiological effect of inhaling it is such that it could be used in this way in a closed room only at the risk of producing sudden unconsciousness, if no worse effect.

STUDENTS of architecture in search of a new *motif* for a design may perhaps get a hint from an invention described in *Le Monde Moderne*. It appears that French people hold about the same ethical notions in regard to eggs that certain other people do in regard to umbrellas; and, as we are informed, the cook's relatives, the market-man's boy, the laundress's messenger, and other people of that sort, on their visits to the château, usually manage to pass through the "*basse-cour*," and to slip into their pockets such new-laid eggs as the poultry, to whom the *basse-cour* is devoted, may have left in sight. As *Le Monde Moderne* remarks, with truth, the housekeeper cannot be always on the watch to snatch up the eggs as soon as they are laid, and put them beyond the reach of marauders; and yet it is annoying, to say the least, to have one's harvest appropriated by other people. To meet this difficulty, the editor proposes that the *basse-cour* should be fitted up with nests, furnished with inviting-looking poles for perching, and supplied with the necessary number of glass eggs, securely fastened to the bottom of the nest, which slopes backward, to an outlet, consisting of a narrow slit. When an egg is laid, it is supposed to slide backward on this inclined plane, and drop through the slit, falling on a bed of cotton-wool. This bed is, however, inclined forward, so that, after reposing for an instant on the cotton, the egg resumes its journey down the second bed, from which it drops through another slit into a locked drawer, the key of which is retained by the housekeeper. By this means, as *Le Monde Moderne* thinks, all the eggs would be preserved for the owner, and a burden of guilt would be removed from the souls of the pilfering visitors. Not being expert in poultry matters, we will make no criticism on this device, as a means of increasing the returns from an investment in hens, unless to observe that it seems to assume that hens lay eggs only when they are asleep, which, if we are correctly informed, is not the case. This question, however, has nothing to do with the excellence of the artistic suggestion contained in it, which we commend to the attention of our readers. Briefly, the combination consists of an enclosure, containing a horizontal pole, with suitable access for the hens, from below, openings above, to admit the sunshine which is known to be so necessary to gallinaceous health, and drawers beneath. Obviously, much fancy may be exercised in the choice of shape and position for windows and entrances; the level of the perch might with advantage be "accused" on the exterior by an enriched band; and the locksmith's work admits of great richness; so that an elevation of the structure, diversified with portraits of its occupants, and rendered in color, might be a charming object.

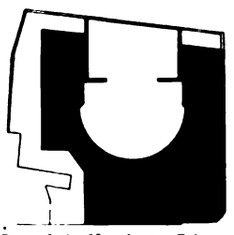
IN connection with the rather overdone international celebration of the opening of the North Sea Canal, it may be interesting to know that, according to the *Deutsche Bauzeitung*, the whole affair was the outcome of private initiative. Of course, there have been for centuries successive projects for making a navigable waterway between the North Sea and the Baltic, and, in 1785, the Danish Government actually completed what is known as the Eider Canal, between the ports of Tönning, on the North Sea, and Kiel, on the Baltic. This canal was formed mainly by dredging and embanking the river Eider, and cutting a connection from its upper waters to the Kiel Fiord. It would only admit small vessels, but was of considerable commercial value, some four thousand craft per annum passing through it, on an average, until its eastern end was incorporated in the new canal. By the conquest from Denmark of the provinces of Schleswig and Holstein, the canal district fell into the hands of the Germans, and many attempts were made to induce the German Government to do something toward forming a ship-canal, not only for the commercial, but the military advantage of the new Empire. The Government, however, turned a deaf ear to these appeals, and, although some plans were made, under Government permission, nothing of serious importance was due until a Hamburg merchant, Herr Dahlström, took it into his head that such a canal would pay as a private enterprise. He commissioned, accordingly, the engineer Boden to examine the ground and draw up a definite scheme. Boden carried out his work thoroughly, and he and Dahlström were engaged in making calculations as to cost, probable income, and so on, as a basis for the financial plan, when the Imperial Government intervened, voted funds for commencing the work as a public enterprise, and practically adopted Boden's plan as a basis for the scheme which was finally evolved by the Government engineers. It was, perhaps, fortunate for Herr Dahlström that the Government took the enterprise out of his hands, for the cost of the canal, as completed, has been thirty-nine million dollars, and it is very doubtful whether the tolls would ever pay interest on that sum as a commercial undertaking. As a military convenience, however, it will probably be worth to Germany all that it has cost, even if the tolls from merchant vessels should not pay more than the expense of maintenance.

LA REVUE INDUSTRIELLE contains a sensible article on the recent advance in the price of petroleum, and the reasons for it. That the advance in price was made necessary by the diminishing yield of the oil-wells, it does not believe. Neither in the United States nor in Russia do statistics show any very serious diminution in production. It is true that, in 1891, more than fifty-four million barrels of oil were taken from the American wells, and in 1894, only about forty-seven million, but in 1890 the production was only forty-five million, and the statistics of the average price of oil point rather to a diminution in production for the sake of raising the price than to a decrease in the natural supply. Comparing the figures of the exportation of oil for the past two years, we find some singular indications. While the quantity of illuminating oil exported from the United States in March, 1895, was about forty-five million gallons, or nearly one-fifth less than in March, 1895, the exportation of naphtha nearly doubled, that of lubricating oil increased nearly one-half, and that of residues increased from sixteen hundred gallons to about forty-seven thousand. These facts seem to *La Revue Industrielle* to indicate some sort of understanding between the American and Russian producers, by which, while a part of the American exportation of illuminating oil is withdrawn, the balance is made up by an increased sale abroad of naphtha and lubricating oil. As the producers obtained a much larger price in this country for their illuminating oil than they did in 1894, they were probably quite contented to lose a part of their European market. It is, however, curious to note that America has exported, as a rule, about one-fourth of its production of illuminating oil. Supposing one-fifth of this to have been kept at home last year, owing to the circumstances which we are trying to investigate, as was in the case in the sample month of March, 1895, the quantity retained would not only have increased the home supply to the figures of 1893, but a million and a half barrels beyond; so that, roughly speaking, thirty-eight million barrels were sold at home in 1894, at an average price of eighty-four cents a barrel, while in 1893, only thirty-six and one-half million barrels were sold, at an average price of sixty-four cents. It is hardly necessary to point out the enormous profit involved in the arrangement, supposing that there was such an arrangement, by which the market could be so manipulated. That the producers on both sides of the ocean have long been desirous of coming to an understanding is well known, but an insurmountable obstacle has hitherto been found in the dissensions of the Russian producers, who have carried on a savage competition among themselves, the price of crude oil varying in 1893 from 1,40 francs to 4,36 francs per ton, delivered at Baku. Naturally, no agreement could be reached by the American producers with combatants of this sort, and it was not until last year, when the Rothschilds and others are said to have acquired an interest in the Russian wells, that matters were in condition for an arrangement. Of course, no contract is known to have been made, and probably none would be avowed; but that excessive competition in producing and selling has been checked by some sort of understanding is a good deal more likely than that the oil-wells are beginning to run dry.

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THEATRES.[1] — XVII.

MANCHESTER PALACE OF VARIETIES.

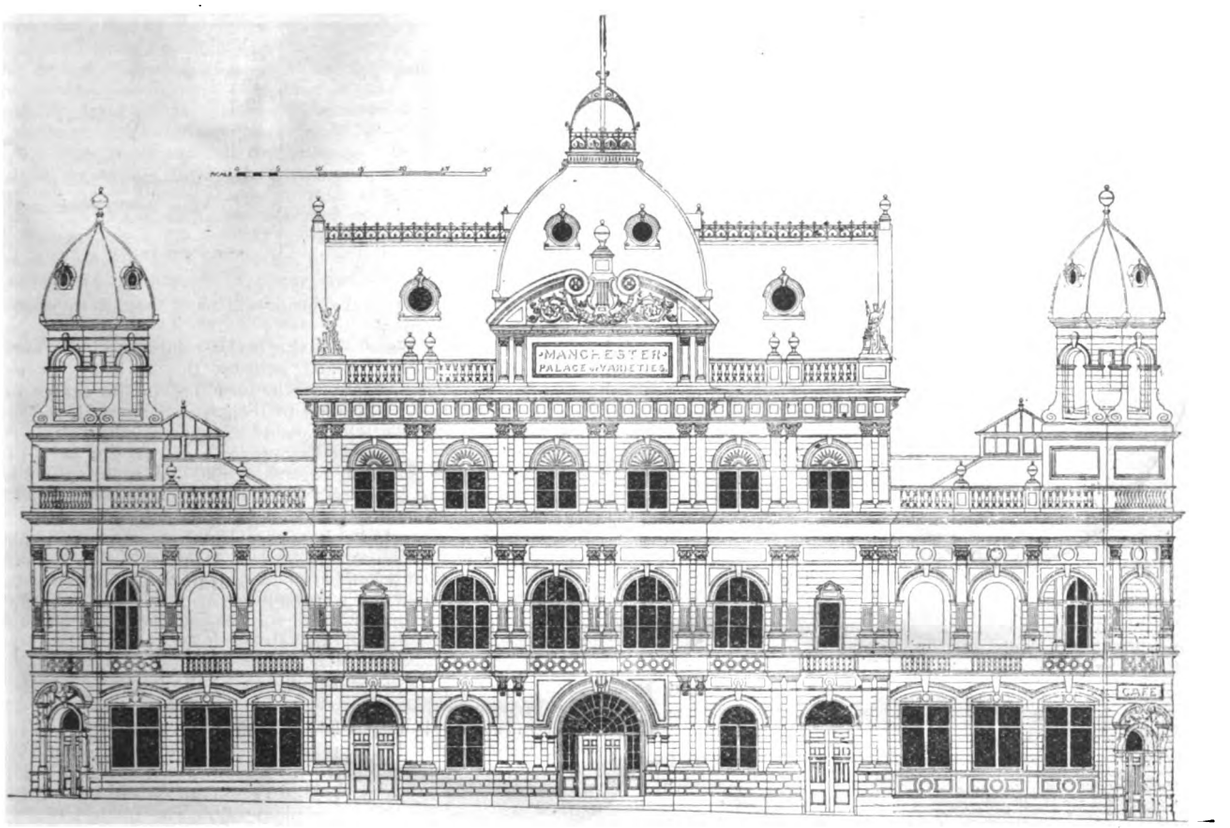


Plan of the Manchester Palace of Varieties.

MANCHESTER has one of the largest and finest Theatres of Variety of any of our English provincial towns, and it is this building which forms the subject of the present article.

The well-known firm of Manchester architects, Alfred Darbyshire, F. S. A., F. R. I. B. A., and F. Bennett Smith, F. R. I. B. A., responded readily to my appeal to be allowed to include this as one of their works in the present series of English and foreign theatres. The ample proportions of the building, with the clever and simple planning of the house, assert for this theatre a place among the very best of any country.

One has only to study intelligently the plans of the building to see that it has been designed for the purpose of an English variety theatre of an advanced type. The ample stage is large enough to produce the most luxurious spectacle or ballet, while the auditorium is arranged with promenades, foyers and lounges of a size seldom to be found in England, even in theatres of the character where the audience is more than half composed of those who prefer moving about to being seated during the whole of the performance. Such spaces



are indeed a necessity in theatres where the performance is a continuous one, and where people have not the opportunity of stretching their limbs between the acts.

Messrs. Darbyshire and Smith, the architects, were instructed in the autumn of 1888 to prepare designs for this building, and on the night of May 18, 1891, it was opened to the public for the first time. To carry out the initial condition of safety, namely isolation, it was necessary to find a site which, if not surrounded by streets, would be large enough in its area to enable the designer to create streets or open spaces of their own. Hence, the site chosen was one which allowed of these important provisions, with two frontages, the one to Oxford Street, the other to the new thoroughfare known as Whitworth Street. The site was mostly open and in order to complete the isolation, some old buildings were demolished and the corporation undertook the formation of Whitworth Street. The Palace thus stands in the middle of an open space. The ground to the left of the building allowed the architects to place the lime-light tanks, electrical-plant, carpenter-shops and all other dangerous elements of the stage requirements quite outside the building. The site thus formed comes up to the most advanced English regulations and it may be looked upon as an exceedingly good one. Every advantage has been taken of the ground by the architects, and one point I would impress upon my readers is, that in spite of the somewhat irregular shape of the ground a plan has been designed with a symmetry and simplicity which denote a thorough knowledge by the designers of the many wants of theatrical buildings. A tricky plan is never a clever plan of a theatre: the more simple the plan the safer the building, and in this case every entrance, exit, passageway or staircase on the one side has its corresponding entrance, exit, passageway or staircase on the other, so that anybody entering on the right and being seated on the left will find near their seat on the left a corresponding way out to the way they came in by on the right. This is one of the most important provisions to be made with regard to public safety. Exits should be placed where they can be easily found, and where they may be expected to be found.

Of the two frontages, the principal one is toward Oxford Street, the side one next to Whitworth Street. The Palace of Varieties forms one of the most recent examples of theatre architecture and construction in England and in many respects it follows the lines and features of the Irving-Darbyshire "safety" plan carried out in the rebuilding of the Exeter Theatre [Of this I shall have more to say when illustrating the Exeter Theatre in another number of these papers], the main point of divergence being the addition of a second tier of seats, called the amphitheatre, in place of the old gallery.

The great principle of isolation, which has been adopted as a *sine qua non* by the Manchester County Council, has been adhered to and no new theatre will be licensed by that body unless erected on this fundamental principle. The pit portion of the theatre is below the street-level, as in the Irving "safety" plan, so as to reduce the height of the amphitheatre from the street-level as much as possible.

Each portion of the house has its exits communicating directly with the streets. The pit has four exits, counting the entrances each as one; the grand balcony, three; and the amphitheatre, four. All the passages, floors and staircases used by the public and the artists are of iron and concrete, so that there is a safe means of escape in case of fire or panic.

The auditorium is placed parallel with the proscenium instead of as a prolongation of it, or, in other words, the architects have returned to the old Greek form of the semicircle, which brings the audience nearer to the stage, the proscenium-opening being widened to accommodate this expansion of the auditorium. Having decided upon this method of planning, the next point of interest, still following the Greek model, was uninterrupted sight-lines from each seat. This end has been secured in the following manner:

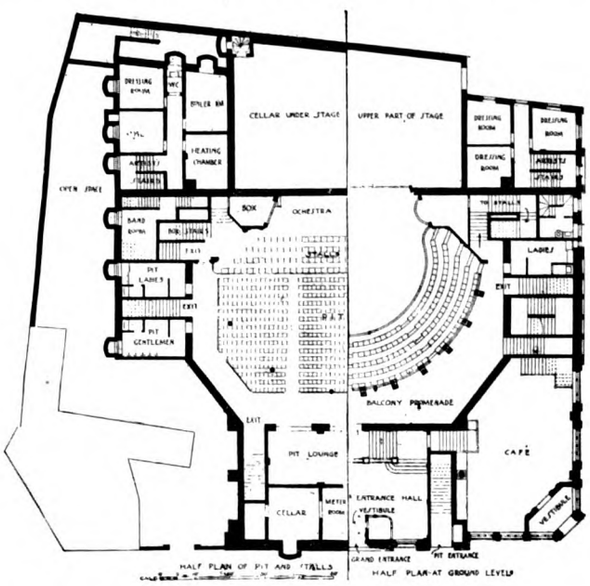
The eight large columns supporting the superstructure of the two tiers are set back, and the girders resting on them are of a cantilever character, with an overhang for the balcony above. The coupled columns, supporting the amphitheatre, stand on the back of these cantilever beams, at a position which, for clearness of explanation, may be said to represent the position of the circular wall

[1] Continued from No. 1011, page 56.

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forming the passage at the back of the old theatre tiers, and through which access is obtained to the seats. There are thus no columns in the circle, no seats coming farther back than the columns, and as there is no tier above the ampitheatre, that portion has a free and uninterrupted view of the stage and of the top portion of the great auditorium. The ceiling is formed by a large "cove," from which springs an elliptical dome at 60′ from the floor. The auditorium is 90′ wide and 66′ deep; the stage is 66′ by 40′ deep; and the proscenium-opening 36′ wide by 32′ 10″ high. The highest point the audience can reach from the street is 33′ 6′.

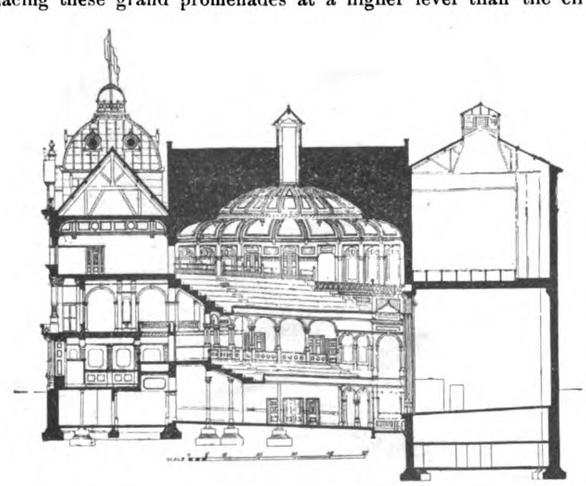
Carrying out the principle of isolation in detail in the interior of the building, there is no opening of any description except the stage



opening in the proscenium-wall. The members of the orchestra have a separate entrance and exit from the streets, and the manager passes to the auditorium by a door in the immediate proximity of his own room. The large proscenium-opening can be closed in ten seconds by a fire-and-smoke-proof curtain, made of the new material, "Titancrete," which has a light specific gravity and is unburnable.

The stage is roofed with the same material, and an immense funnel is formed in the centre which will absorb all smoke or poisonous gases in case of conflagration. The artists are placed on either side of the stage which is shut off by the automatic Titancrete door, and the dressing-rooms in each wing have an escape staircase which leads direct to the streets. The fly men and paint-room men are similarly provided for and the stage itself has two exits direct to the streets.

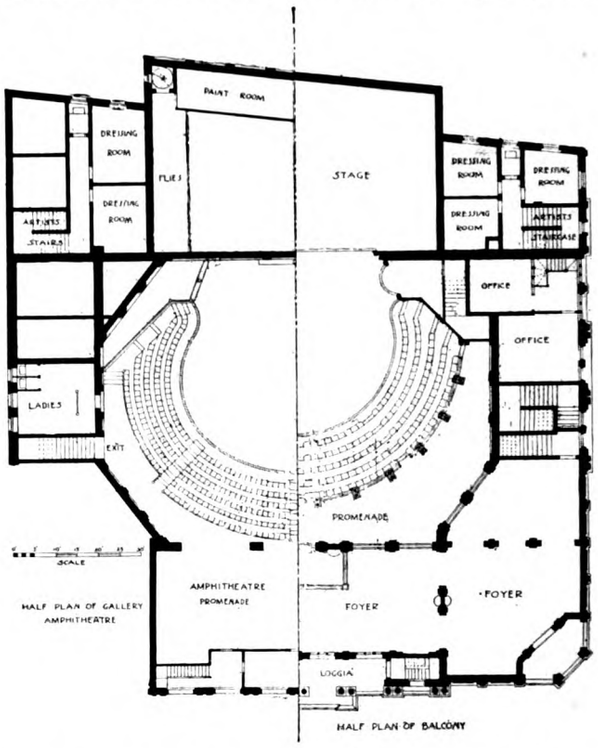
An important and novel feature of the section of this building is that the persons in the grand foyer and the winter-gardens can see the stage without going into the auditorium. This is achieved by placing these grand promenades at a higher level than the circle



promenade, and by raising the amphitheatre somewhat higher than usual. The walls of the foyer and winter-gardens are pierced by arcaded openings protected by balustrades, through which an uninterrupted view of the stage can be obtained. From the foyer there is an entrance to the external loggia, which constitutes a smoking-lounge in summer. There is a promenade from this portion of the theatre, through the balcony to the boxes, stalls or entrance-hall.

Another notable feature is the arcade round the balcony, formed by the coupled columns supporting the amphitheatre tier, and the arches which they carry follow the sweep of the circle.

In addition to the other means of safety already described, all the doors are fitted with automatic exit bolts, the effect of which is that while the doors remain secure from the outside, the slightest pressure



upon the cross-bars upon the inside will cause them to fly wide open in an outward direction.

The professional reader will the better comprehend the arrangements made for entrances and exits in this building by closely examining the plans, when it will be seen that in the centre of the front elevation is the entrance to the grand hall. This is fourteen steps below the level of the balcony promenade, which runs round the back of the whole of the balcony seating. At the back of this promenade and immediately over the grand hall is the grand foyer, already referred to in detail, which is extended on the right over a space occupied on the ground-floor by a café, and above by a winter-garden. This foyer is approached from the promenade on the right, through the winter-garden. How this foyer stands in relation to the balcony can best be ascertained by reference to the longitudinal section, from whence it will be seen that over the balustrade in front of the foyer a good view of the stage can be obtained above the heads of those walking about in the balcony promenade as above described.

The extra exits from the balcony are arranged on either side from the promenades.

The pit and stalls are, as I have said, sunk below the level of the street, the entrances to the pit being placed one on either side of the Grand Hall in Oxford Street, while the stalls are reached from the balcony promenade by box staircases, one on either side of the house and next to the proscenium-wall. The pit has two extra exits in addition to the two entrance staircases, and the stalls are also provided with direct exits into the side street and open space without having to traverse any other portion of the house. The exits, therefore, from this level are most ample, and in every case lead up from the seats by one flight of stairs directly into the open air without any turn or bend. There is a large lounge behind the pit, and the space under the café is used as a grill-room and kitchen.

The gallery, or amphitheatre, is approached from Oxford Street by a staircase, square on plan, and has an exit on the left side similar in all respects leading into the open space. There is a large promenade on this level also, placed behind the centre block of the seats.

It will be noticed that a very liberal space is given on each floor to ladies' and gentlemen's retiring-rooms, and that on the first level, where the number of people is greatest, these rooms are duplicated and found, one for each sex, on both sides of the house.

Still examining the plans, we must now pass to the back part of the house and see what provision has been made for the comfort of the artists. On either side of the stage in a separate block is a suite of dressing-rooms approached by a broad staircase and with water-closet accommodations on each level. The basement of these blocks is used for the heating chambers, boiler-rooms, coal-cellars, etc.

The stage is designed with flies, painting-room, cellars and special scenery entrance and has all the usual mechanical contrivances to render it suitable for the production of spectacle and ballet.

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A large exhaust ventilator is placed over the stage as an extract for smoke. The stage is divided from the auditorium by the fire-resisting curtain already mentioned.

In designing this building the architects aimed at adding to the street architecture of Manchester something which would not only have dignity and plenty of light and shade, but would if possible possess some attraction of color. With a view to secure this, they decided to attempt a revival of exterior decoration in gesso-duro and graffito, in a treatment of red and gold. The interior decorations are of fibrous plaster in relief, the color scheme being cream, gold and scarlet. The entrance into the balcony is marked by a beautiful marble doorway containing most elaborate carvings which was secured from a dismantled *palazzo* in Italy. This doorway stands upon a wide Sicilian marble staircase of appropriate design, which forms the double ascent from the hall to the balcony promenade.

It is not often that we can ascertain accurately the cost of a theatre, but in this case the architects have furnished me with the information that the cost was a little over £40,000.

The amphitheatre ironwork is composed of fourteen wrought-iron built girders, one portion of each being a cantilever. This ironwork is calculated to stand a total distributed load of 430 tons, with a factor-of-safety of four. The amphitheatre has an area of 2,866 square feet; the girders are each supported near the overhanging portion by twin cast-iron columns, which will each carry a load of twenty-seven tons, with a factor-of-safety of fourteen. These columns, in their turn, are supported by the girders that support the circle.

The circle ironwork is composed of eight main cantilever girders and six cross girders, which in their turn support one end of six intermediate girders; the eight main cantilever girders are supported ten feet from the overhanging end by eight cast-iron columns, which will each carry a load of 86 tons, with a factor-of-safety of fourteen. These columns also carry the ends of the cross girders which support the intermediate girders. The cantilever girders, in addition to being supported by the columns, are built-in and securely tied into the main walls of the building. The circle ironwork is calculated to stand a total distributed load of 530 tons in addition to the weight of the amphitheatre with a factor-of-safety of four. The circle has an area of 3,530 square feet.

This arrangement has enabled the architect to dispense with any columns whatever in front of or among the seats; the columns supporting the circle in the pit are behind the last row of seats and the same is the case in the circle.

The girder carrying the brickwork over the proscenium-opening is 42′ long by 4′ 6″ deep by 2′ wide, of the box type, and carries a load of 200 tons.

The girders that carry the fly galleries are 4′ deep and 18″ wide, and are supported at one end by the proscenium-wall and at the other by the stage-wall. The fly-gallery girders also carry a girder 51′ long by 4′ deep by 18″ wide, which carries a load of 100 tons. The above girders all have a factor-of-safety of four, and the total weight of the last four girders is 36 tons.

The factor-of-safety of the cast-iron is fourteen, while that of wrought-iron is four.

The majority of theatres are subject to chilling draughts, owing first to an inadequate supply of air, consequently the air rushes through every crevice and doorway with such force that very unpleasant and cold draughts are created. To avoid this, heating appliances have been put in the entrances to temper the inflowing air, with valves to regulate them. The incoming air is warmed by arranging heating coils in vertical shafts, delivering the warm air into the building at a height of about 6′ from the floor, as it has been found by experience that cold air cannot be delivered in such buildings without inflicting cold draughts upon some of the occupants.

The ventilating appliances have all been made specially for the purpose, using cast-iron as much as possible for durability. There is not a single fireplace in the building, so that the danger caused by open fires is thus excluded from the theatre.

The following is the holding-capacity of the house:

Basement,	Stalls	140
	Private boxes	20
	Pit	736
	Pit promenade	430
Ground floor,	Balcony	260
	Promenade and foyer	550
	Private boxes	10
First floor,	Gallery	482
	Promenade	400
	Total	3,078

Four thousand people were in the theatre on the opening night.

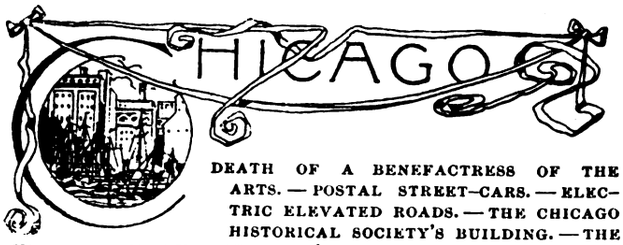
According to the custom I have adopted in these articles, I give a table of some of the chief dimensions of the building:

Width of proscenium-opening	36	feet.
Height of proscenium-opening	33	"
Depth from curtain line to back wall of pit	68	"
" " " " " balcony front	42.6	"
" " " " " gallery front	51.6	"
Width between side walls of auditorium	90	"
" " " " " stage	66	"
Height from stage-floor to gridiron	63	feet.
Width of grand hall	47.6	"
Breadth of grand hall	31.6	"
Width of grand staircase	8	"
" " pit staircases	6	"
" " all others	5	"

Height from pit floor to ceiling: 60 feet to spring of elliptical dome, 68 feet to crown of dome.

ERNEST A. E. WOODROW.

[To be continued.]



DEATH OF A BENEFACTRESS OF THE ARTS. — POSTAL STREET-CARS. — ELECTRIC ELEVATED ROADS. — THE CHICAGO HISTORICAL SOCIETY'S BUILDING. — THE VIRGINIA LIBRARY. — ST. PETER'S CHURCH. — THE SKETCH-CLUB EXHIBITION. — THE ART INSTITUTE WORK. — A FURNITURE EXHIBITION. — THE POST-OFFICE QUESTION.

WHERE has this month passed away from among us one who has done more than any one, or, in fact, any twenty other persons combined, to make possible much of the best architecture of our city. Born in humble circumstances, she continued to live on in the utmost simplicity long after her labor had borne its fruit in stately libraries, churches and warehouses, rich business blocks and luxurious houses rising around her on every side. Notoriety came to her unsought and unwelcome, and though reluctantly acknowledging the act which made her famous and which was the master-stroke to clear the field for the best efforts of our architects for over twenty years past, still she sought to live known only in the circle of a comparatively few congenial spirits; modest and retiring, in fact, fearing as an unpleasant necessity the mere mention of her famous deed. The partner of her labor who so well seconded her efforts has long since passed over to greener pastures, while she, herself, has scarcely realized the good work she has done. No patron of the arts and sciences has ever driven the plow with a more unsparing hand through the field where some day was destined to flourish the brightest flowers of architecture. Nothing was spared within the reach of the power which was to open to architecture a field equalling, if not surpassing, that found in the Rome of the Cæsars. This last week Mrs. O'Leary has succumbed to the weakness of the flesh and has passed away, not far from the spot where twenty-four years ago, in combination with a cow and a kerosene lamp, she performed her great act, by which Chicago was freed of more second-rate buildings in a shorter space of time than had any other similarly burdened city ever been. Mrs. O'Leary, it is said, always owned up handsomely till the very day of her death to the act, the consequence of which came to Chicago rather in the form of a blessing in disguise, but never did she voluntarily introduce the subject herself, which was always a painful one, full of annoyance and mortification to her.

The cow, at least, would scarcely recognize the West Side, which it left over twenty years ago, and the prairie pastures, where with others of its kind it used to graze, would be but a dim and flickering remembrance among the blocks of brick and stone, the jingle of cable bells, the screech of trolley-wire, or the dim shadows from the elevated roads. Chicago now has over two hundred miles of electric road, notwithstanding the fact that with few exceptions the electric lines do not enter the centre of the city, but only connect with the cables in the less-crowded districts.

An interesting experiment is just now being tried on some of the West Side surface roads in the carrying of the mails in the street-railway cars. One-half of the car is painted very prettily a white or creamy tint, and while the passengers sit as of old in one part of the car, in "Uncle Sam's" pure and spotless domain a deft-handed postal clerk is busily engaged in sorting letters and papers. The ostensible reason for this experiment is to arrive promptly and easily at the distant quarters of the city with the bulky mail-bags, though secretly there lurks behind it all a willingness on the part of the railway officials to have the strong arm of Uncle Sam spread over them in times of strikes and disturbance. The move has met with considerable opposition on the part of the railway employés, though neither they nor the employers mention anything about preparing for war in time of peace.

Within the past year or two, as before mentioned in these letters, the first elevated road was set in operation, bringing into convenient contact with the heart of the city much previously unavailable property. The Metropolitan Elevated, only recently put in working condition, has introduced several new features which mark an advance in the operation of overhead transit. The motive-power of the road is electricity, the motor being introduced into one corner of the front car of each train. This is the first elevated road of any importance in this country using this system, which is practically the same as that used at the World's Fair. Of course, in the use of this system, the minimum amount of noise and dirt is imposed on the people living along the route of the road, while passengers enjoy an equal immunity from these two annoyances. The cars are not only lighted but heated by electricity, the heating appliances

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being placed under the seats. The policy of the Company has been quite different from that usually pursued by similar corporations. Property has been bought where possible, or, where not, condemned for the right-of-way, rather than utilize the public streets by means of a franchise. The entrance into the heart of the city has been difficult enough, even in this way. The road-bed, which is a broad one with four tracks, cuts a broad swath through many substantial brick blocks, some small three-story city residences, while one, abutting on the river, is an eight-story structure. The buildings thus mutilated have their walls carefully closed and cemented, and the remaining portions are left intact for their usual occupants. The down-town structure is quite an interesting example of modern engineering. A comparatively new six-story building was purchased; the stories on a level with the tracks were tunneled, so to speak, and the trains permitted to enter into the heart of the building. Access to the trains is through the central front entrance of the building, and up over stairs, past the ticket-window, where the ticket-seller and ticket-chopper are united in one man, doing away with both tickets and conductors on the train. The offices of the Company are in this structure, and three or four stories rise above the track-sheds undisturbed by the apparent change in their foundations. In crossing the river, which at this point is very narrow, a bridge is used — which actually consists of four separate and independent bridges — of the cantilever type, one track upon each bridge. This construction obviates the necessity of a central pier in the narrow part of the river, and solves the problem of lack of room for a swinging draw. Each bridge, composed of the two cantilevers, springing from opposite sides, has the cantilever so pivoted as to permit of the upward opening of the bridge for the passage of vessels.

The down-town loop, which is to connect the various elevated roads and be used by them, is in course of construction, though to complete the contemplated entire road is not yet possible, owing to delays in obtaining the right-of-way.

In last month's letter several semi-public buildings were spoken of as completed, or as fast approaching their time of completion. The Chicago Historical Society's house on Dearborn Avenue is one of these. On the exterior the building is not nearly so successful as many that have come from the same source. It is Romanesque in style, but is decidedly lacking in that harmony and success of outline which is usually the result of careful study, strengthened by previous knowledge and experience. The features of the entrance and central front façade are especially weak. A rather meaningless arch spans the main entrance, an arch which loses its character inasmuch as abutting practically on nothing, it naturally carries no actual weight. Inside this arch a most preposterous carving represents some early historical scene between some of the Catholic fathers and the Indians. Crude and weak in design and execution, as it is, this carving could only have been an interesting feature in an historical library had it been the work of the aboriginal red man whose portrait it portrays. It may possibly be that the pre-historic efforts at art were here sought to be duplicated in manner and what appears like careless workmanship is in reality the result of especial effort.

A small feature of the exterior, but one which is not entirely in keeping with the style of the whole, is the introduction of iron gates of a Colonial design by the side of a structure whose leading characteristics are Romanesque. The building, no doubt, as constructed is admirably suited to its use. Destined to hold valuable historical collections, it is made as nearly fireproof as any building can be. The walls are red granite — a dangerous stone, however, for fireproof work, as shown by Boston's experience in her great fire. The floors are mosaic, staircases of stone, while the doors, book-shelves, frames of windows and skylights are metal. No furnishing is as yet visible in the place, but the newspapers have it that steel and aluminium will be used in the furniture, asbestos in the hangings, while the picture-frames will be a combination of steel and plaster. Two mantels of historical interest grace the interior, one of white marble from the old Mahlon D. Ogden mansion, which, though a frame residence, escaped burning in the great fire, and the other, one of composite character, the material being taken from the old Illinois Central depot, the old County Court-house, and what was known as the Nixon Building, another structure which practically passed through the fire unscathed.

In very direct contrast to this library building, in beauty of proportion and refinement of detail, is the charming little structure known as the Virginia Library, connected with McCormick Theological Seminary, in the northern part of the city. The building is comparatively small, consisting of a main two-story central pavilion, and two lower side wings. It is of buff Bedford stone, and in all particulars adheres to the Classic style, which naturally gives us a building of fine and satisfactory proportions. Not only is the design excellent, but the execution of the details is very charming. The mouldings are finished and studied, and the whole result most satisfactory. It is to be regretted that so good a building should not be more advantageously placed in the grounds, or that the possibility of getting a view of it, as a whole, should not be greater. There evidently has been no plan of the grounds, as a whole. The largest and most aggressively bad building of the group occupies the central and most conspicuous place, while apparently each new building has been allotted the next best situation left, till at last this really fine structure, by all odds the best in the grounds, is obliged to take a very unfortunate position. Very few building-committees ever realize the all-importance of securing the aid of the very best available landscape-gardener, and allowing him, in consultation with the architect, to block out some plan for the future situation of probable and possible buildings. At the best, the landscape-architect has but few chances in this vicinity as yet, but already an entering wedge has been introduced, mainly, it would seem, in this as in scores of other matters, through the education, or more properly the beginning of the education, which the World's Fair offered in this as in all directions. Ten years ago a small country-place which was laid out by a landscape-gardener was a thing simply unheard-of in this part of the country; and to the average land-owner, if such a thing had been suggested, it would have only brought to his mind, on a hundred or eighty foot lot, the possibilities of miniature mountains, artificial lakes, rustic bridges and rock-work. As it is now, occasionally a man of this profession is consulted about the ground around suburban houses, and in the harmonious grouping of shrubs, the economy of room, the appropriate use of certain trees and plants in certain locations: the places on which such thought and study has been bestowed are easily distinguishable from the ordinary ones, where trees are planted in rows, and shrubs are dotted over the lawn promiscuously, as is often the case in the average small country-place.

The portico of the Virginia Library is one of extreme beauty, and with the well-proportioned flight of steps leading to it might present an imposing front were the surroundings what they should be, and better calculated to add to, rather than detract, from the dignity of the entrance.

The style of the exterior is well carried out in the interior, which is attractive in its strictly Classic character. There is a chance for much beauty to be added to that already there, or for it to be marred by the decoration, which it is said is as yet a matter to be settled. The spaces on walls and ceilings are left for ornamentation, but as yet the rough plaster does not tell the secret of what is to come. The ideas of the late Dr. Poole are carried out in the avoidance of the old "stack system." The north wing of the building is devoted to the reading-room which, in accordance with Dr. Poole's idea, is well furnished with book-cases for the reference-books. An open fireplace, the Mexican onyx mantel of which is very satisfactory, ornaments the side of the room opposite the entrance. The design is entirely simple, the egg-and-dart moulding being introduced as the chief feature of ornamentation. The ceiling is divided into panels whose ornamentation in plaster mouldings is good in form and style. Spaces are left in the centre of the panels for probable decoration. This whole room, as well as the entrance-hall, gives an opportunity for most successful effects, and it is to be hoped the work that is to come will be equal to what is already done.

Another interesting structure in the northern part of the city is that known as St. Peter's Church, on Belmont Avenue. Like the Virginia Library, the purpose of the structure has been thoughtfully considered in the making of the design, and no dignity has been lost by flippant flights into the untried to attain something striking, novel — and bad. Good taste is shown through the entire structure, both on the exterior and interior. The interior, finished in oak, is especially satisfactory in its open truss-work and Gothic tracery. At present it is finished in plain tints, but should the future see the decoration of the building accomplished in complete harmony with the style, the result will evidently be one of the most Churchly ecclesiastical interiors of the city.

The Chicago Architectural Sketch-Club has, since the date of our last letter, closed its annual exhibition, held, as last year, at the Art Institute. The general opinion seems to be that the display was equal to that of last year, although there certainly has been a larger amount of inferior work admitted than previously. There were an unusually large number of school drawings displayed, a few of them extremely good, and of especial interest to all draughtsmen and students as showing methods of composition, and especially methods of rendering well worthy of study. But, again, many of them were essentially poor, badly rendered and generally soiled and dirty. It may be expressing a very unorthodox sentiment, but certainly, to the writer, a poorly composed design is uninteresting enough, but such a drawing with the dirt not cleaned off the paper, and the rendering so careless and generally "smutched" that it becomes an eye-sore, even if done in the famous École des Beaux-Arts, is unbearable in a public exhibition. It scarcely seems necessary that these poor things, which were not deemed by the French school as worthy even of a "mention," should be permitted to obtrude themselves upon square yards after square yards of the wall-space devoted to this annual display, and in the future a little more pruning in this direction by the jury would be well received.

The catalogue-cover this year and the general make-up of the book were quite satisfactory. The advertisements, which for financial reasons it is absolutely essential to have, were not overpowering, but kept well in a secondary place, although some of them were certainly artistic in arrangement and design.

The question of illustration in such a catalogue is certainly a difficult problem to tackle. According to the theory now always supposed to be in practice, no designs, however good, are engraved or paid for by the Club, but any exhibitor who desires more advertising has plates made of his own works and they are inserted in the catalogue. As a result, frequently the poorest things in an exhibition are the ones that are the most prominently brought to the public attention, while many of the really best things are those never impressed on the attention of the casual observer. As long as plates

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have to be made before drawings are submitted to the jury, and as long as they are not specially selected by the jury, it is probable that this state of affairs will continue to exist. If it were possible to find some scheme by which in the future this now general practice might be avoided, even at least in the catalogue of the Architectural Sketch-Club, a very considerable advance would have been made. If necessary, a few more pages of well-paid-for advertisements might be tolerated, if the actual engraving of exhibits could be more intelligently and reasonably selected.

At present there is hanging on the walls of several of the galleries of the Institute a most interesting exhibition of the work done by the school for the previous year. It certainly far surpasses in its degree of excellence the work shown by the school a year or two ago, and the standard seems much higher. The work from the cast in charcoal shows its usual weak points, but naturally when students start at the foot of the ladder the effect of the instruction is not so apparent, as it is only in a few rare cases where genius burns with a lucid light that the early work is clear, strong and vigorous. Passing on to the nude life-class, matters improve a little, though attenuated legs and abnormally developed stomachs still crop out here and there. Still the discipline of drawing begins to tell and many creditable examples are found. The still-lifes in oils and water-colors present many extremely good specimens, and the studies from the costumed model are many of them excellent, both in charcoal, crayon, pastel and oil. Passing on to the architectural drawings, it is really gratifying to note the improvement of the work here exhibited over the very spiritless collections of some former years. Many of the designs have a certain amount of worth in themselves, while in the matter of rendering them great improvement can be noted. The students have also considered it worth while to properly mount their work and in many ways more *esprit de corps* is evinced, a characteristic heretofore much wanting in this place, although often a marked feature in the best architectural schools of this country as well as elsewhere.

The work from the classes in design is especially interesting. Mr. Sullivan, our talented *confrère*, is reported to have had an enthusiastic ambition at one time to found a style. This ambition was not, he felt, to be realized as the years went on, but most assuredly he could feel that his wildest desires had been realized in looking over this exhibition of the classes in design. The Sullivan spirit, which is a characteristic one, pervades everything, and in the advanced classes there is absolutely no other spirit shown, from designs for lace-work and wall-paper up to those for wrought-iron work and mosaic. The designs for architectural ornamentation modelled in clay might well come from the actual hand of Mr. Sullivan. Not only has the geometrical scheme been worked into the idea, but actually the same applied forms of conventionalized leaf and flower petal have been used. Charming as Mr. Sullivan's own work is, it seems rather a pity that a whole school should thus be reduced to a state of almost servile imitation in which all attempt at originality is lost. And this one kind of work is used to the exclusion of examples in all other styles, even such well-known and established ones as Classic, Romanesque, Gothic, etc. There would be very likely to occur times in the future life of the designer when he would be called upon to compose something with these characteristics, and then, from his past studies, one would expect him to be quite at sea. Doubtless if this thing continues there will be a Chicago style resulting in quite different work from that sent out from any other art school, and the adjective Sullivanesque will find here many nouns for it to modify.

Four large ornamental vases are shown in this department. The old Classic shapes are entirely abandoned (not, it might be incidentally mentioned, with any gain in beauty of form) and shapes more suitable to the Sullivanesque details have been substituted.

It is curious to note that in the first year of the designs for wrought-iron work, the prevailing spirit of the school has not made itself felt and some very creditable original work is shown. Another branch which still maintains its independence is that of the illuminated printing. Some poor work is shown, but the two prize compositions are well done, and the view of one with an Elihu Vedder feeling in the swelling lines is especially well conceived.

The work in water-color for interior house decoration has the lowest standard in the work of the whole exhibit. This seems in good part to be due to the fact, that a successful decorator in this department should have some knowledge of architecture, and also that their first style not being always suitable for house-decoration these students are at a loss for ideas for their composition. All architectural skill is shown to be decidedly wanting with this class of students, and impossible pillars and abnormal fireplaces are found in rooms whose harmony of color does not induce one to forget the faults of outline and design.

A set of drawings possessing noticeable excellence are those for a dowery chest. In one, which took the First Prize, or highest mention, we at last see a Classical form introduced, successfully combined with the Sullivan detail. One especially attractive design bears the carved motto, "My Daughter! Oh, my Ducats! Oh, my Daughter!" a bright turning of the well-known quotation to a clever use.

Those interested in this matter of design will find subject for approval or the contrary, as the case may be, in the furniture exhibition just opened here in Chicago. To people who had the opportunity to compare the furniture of various nations, side by side, at the World's Fair, and who look upon the designs for it as they should, as a fine art, this cannot fail to be of interest.

Matters concerning the erection of a temporary post-office on the Lake Front are as yet undecided. Everything is in readiness at the Supervising Architect's office, so far as plans, contracts and specifications are concerned, but certain abutting property-owners, while they promise to make no disturbance in the matter of injunctions, refuse to put their names to any document which will nullify their right to interfere should they feel so inclined. It seems a pity to waste valuable time in this way, when a temporary or most any other kind of a structure is so badly needed by those now employed in the Federal Building. It will soon mean another winter for the men in their old damp, dark and unhealthy surroundings. The Corporation Counsel is hopeful that work can be begun by the fifteenth of this month.

Another new public building which will be gratefully received by the Chicago public is the Contagious Disease Hospital. Heretofore, there has been no hospital where people suffering from contagious diseases could be received, with the exception of that known as the pest-house, and this at times has been so overcrowded as not to be able to accommodate all the small-pox patients. As would naturally be expected, the choosing of its site has given rise to most animated discussion, as no neighborhood was anxious to have the honor of its acquaintance. Plans have been adopted by the Board of Health by which a hundred-thousand-dollar group of buildings will be commenced at once. It is intended to build a permanent administration building, consisting of an office, dispensary, treating-building, engine-house and steam-heating plant. A barn, morgue and disinfecting-house will be built at a considerable distance from this group, while the hospital proper will be connected with them by means of long corridors. The hospital will consist of separate wards connected by halls, and will be so constructed that if at any time it seems wise to burn a part or portion of them, it will be possible to do so. These wards, while having all the latest sanitary devices, will naturally be of cheap construction.

Chicago has for years had the reputation of moving most anything that she puts not her foot, but her mind on. So had Archimedes and she only follows in his methods. A gigantic move which there is talk of undertaking, is to put a certain Baptist Church on wheels and roll it fifty feet south of its present location and six or eight feet to the east of its present site. This Immanuel Baptist Church is one of the largest stone churches in the city and has a spire one hundred and fifty feet high. It is also desired, besides moving the church, to lift it six feet into the air, to give more space in the basement. Responsible movers say it can be done, and it undoubtedly will be a large and interesting undertaking of its kind, if attempted.



LONDON

THE WORKING OF THE WORKS DEPARTMENT OF THE LONDON COUNTY COUNCIL. — THE NATIONAL PORTRAIT-GALLERY. — THE UNDERGROUND ELECTRICAL RAILWAY. — PROPOSED ACOUSTICAL OBSERVATIONS.

THE Works Department of the London County Council has lately passed under a pretty severe attack from that side of the Council which is styled "Moderate." This party formed the opposition when the Department was launched, and at the last election was returned in a force almost equal to that of the Progressives. Much party profit was made at the elections by the Moderates out of alleged bad management in this department, whereby the actual cost of works executed had greatly exceeded the estimated cost. It will be remembered that the department in question arose some two years ago and was more the creation of necessity than choice. Contractors refused to tender, or having tendered, frequently withdrew, because the guaranties demanded by the Council as to the rate of payment of workmen, and the stringent requirements as to materials and workmanship rendered, in their opinion, a profit impossible. It was under such circumstances that the Council decided, too glibly to satisfy their opponents, to establish a Works Department and become their own contractors. A short time ago the department submitted to the Council its half-yearly report of all works executed to date. The total estimated cost had been £176,086, while the actual cost came out at £178,863, or an excess upon the estimates of £2,777. At the meeting of the Council to discuss the report, not a few of the Moderate party urged that it was not yet too late to return to the system of employing contractors. Mr. John Burns, M. P., however, in an effective speech, again drew their attention to the fact that the Council had assumed a Works Department because no other course lay open to it. He went on to point out how unfair was the treatment the young department received from members who neglected to take into consideration the immense difficulties to be overcome. That such a vast organization

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had been formed and that so much work had been carried out in a short space of time, at an excess upon the estimates of only one and one-half per cent, was, he contended, little short of marvellous. The difficulties of premises and proper organization had been stupendous, but everything, he claimed, was now in working-order and he looked confidently to the department not only to wipe off in the next two years the losses of the past two, but to show a handsome balance into the bargain. Ultimately, the report was passed and the increased expenditure sanctioned. There is no doubt that there has been mismanagement in some quarters of the department, but the case has not been made out that the department is a failure. With this slight shaking and the experience of organization which two years has brought, we may yet hope to see the municipality as employer very practically successful.

Not very long ago the Right Hon. Herbert Gladstone, First Commissioner of Works, gave out in the House that Her Majesty's Government intended to proceed as soon as practicable with the scheme for widening Parliament Street where it opens into Parliament Square. As long ago as 1887, the improvement was approved by Act of Parliament, but monetary and other difficulties have hitherto prevented the carrying-out of any private scheme. Parliament Street, for the most part of its length, averages in width 125 feet; it is only the last hundred yards or so which suddenly narrows down to about half that width. When this is thrown open, Parliament Street will form one of the finest thoroughfares in Europe, while the view of the Houses of Parliament and Westminster Abbey, from the direction of Trafalgar Square will be immensely improved. It was thought that the Government intended to build new War Offices on the site that will be left vacant after the clearance, but now that the Government in question no longer exists, it is possible that the scheme may be hung up for some considerable time: especially as the Conservatives, if they can afford building operations at all, are half pledged to carry out the completion of South Kensington Museum.

The new National Portrait Gallery, which has been attached to the National Gallery from the designs of the late Mr. Ewan Christian, is now practically completed, and the work of moving the portraits from their present temporary positions has begun. It is hoped that the new buildings may be thrown open to the public early in November. Considerable space is taken up at the back of these buildings by some barracks; these will probably be transferred before long to the more open and suitable site on the Millbank Embankment. This is the site upon which originally Millbank Gaol stood, and which is now partly occupied by the Gallery of British Art, building by the munificence of Mr. Henry Tate at a cost of £80,000. When the barracks are transferred to this site, most useful space will be afforded for necessary and convenient extension of the National Gallery.

The Underground Electric Railway which, passing beneath the bed of the Thames will connect Waterloo Station with the City, is being pushed forward at a rapid rate. The work was begun about a year ago at two points in the river-bed near the south side of Blackfriar's Bridge. Two cylinders, 45 feet in length and 9 feet in diameter, were brought down to the clay-level by union screw tackle, one over each of the designed positions for the up tunnel and the down, respectively. The tunnels were then worked in either direction towards the termini of the line. Encounters with litigants and physical difficulties, such as water-bearing strata, etc., have checked the works from time to time, but the tunnelling is now progressing, in the aggregate, at the rate of 200 feet per week. Each tunnel when complete will start from its terminus with a sharp descent, rising at an easy slope as it reaches its destination. Thus the two lines vary very considerably in level at most points. The total length is to be 1½ miles and the width of each tunnel is about 13 feet. The City terminus will be near the Mansion House, the station lying 63 feet below the level of the roadway; the Waterloo terminus will lie at a depth of 35 feet below the level of the platforms of the present Southwestern Railway. There will eventually be connection at the Mansion House between this line and the projected Central London Electric Railway, for which powers have already been granted by Parliament. The total cost of the present undertaking is estimated at near half a million sterling, and it is thought that eighteen months will now be sufficient to complete the works.

Mr. James Brooks, Vice-President of the R. I. B. A., is this year the recipient of the Gold Medal. It is in ecclesiastical work that Mr. Brooks is best known, and of his London churches the chief is perhaps that dedicated to St. John the Baptist, Holland Park. Unfortunately, however, the west front, of a most vigorous individual design, has not as yet been executed. In response to the Presidential address, Mr. Brooks dwelt upon the advantages which present-day students of architecture possess, and compared them with the 'tumble-up' methods in which he had been educated. The greatest natural gift an architect could possess was, he held, the power of invention, but even this could never become fruitful without systematic training or study. Perhaps the fact that Mr. Brooks was passed over last year by the Council of the R. I. B. A. in favor of the President of the Royal Academy, Sir Frederick Leighton, has rendered members more than usually gratified by this year's choice. But added to this feeling has been the certain sentiment of Mr. Brooks's individuality and complete sincerity of purpose, all of which has gone to render the Council's choice popular as well as gratifying.

Some time ago I had occasion to call your attention to a novel and instructive paper on the "Microscopical Examination of Building Stones," read before the Institute by Mr. Henry W. Burrows, A. R. I. B. A. This gentleman is one of the most energetic of the members chosen to form the Science Committee of the R. I. B. A.; and for this reason I am particularly glad to see that members have testified their appreciation of his work by returning him of the Associates at the top of the poll. His late paper on "Sound in its Relation to Buildings" was fully noticed in your columns. He tells me that it is his intention at an early date to submit to the Committee a concise tabulation of questions of dimension, material, ventilation and conditions generally, all those quantities, in fact, which can possibly affect the acoustical problem. These forms of questions, if the scheme be approved, will be forwarded to gentlemen who are in a position, and willing, to take careful notice of the conditions affecting any public building of interest. It is hoped that, if this scheme be carried through generously, a valuable record will be obtained at little expense; and that possibly by a close comparison of the reports the active conditions may eventually be placed in their proper comparative positions of importance. At present, as Mr. Burrows truly pointed out, the greatest possible divergence of opinion exists amongst authorities on the subject: one will declare that proportion is the thing to study, and another that material is of the first importance, a third that the whole secret lies in a pure and homogeneous atmosphere, to be obtained by perfect ventilation. Professor Roger Smith has lately edited a reprint of his well-known work on "Acoustics," but has not added much that is new. Perhaps if the scheme I have mentioned is carried through, material will come to hand of sufficient interest and importance to justify a new work on this somewhat abstruse, because neglected, subject.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE PRESENTATION OF THE ROYAL GOLD MEDAL.

THE last ordinary meeting of this Institute for the present Session was held on Monday, June 24th, Mr. F. C. Penrose, M. A. (the President) in the chair.

The President said: The first and very agreeable duty which we have before us this evening is, as you are aware, that of handing, in Her Most Gracious Majesty's name, the Royal Gold Medal to the man of your choice. He is an architect whose works fully entitle him to receive it, and we may feel the greater pleasure in conferring the honor because the recipient is one of our own body. The Institute has so fully endorsed the recommendation of the Council that it implies a thorough appreciation by the general body of the reasons which led the Council to make that recommendation. I may therefore, perhaps, be thought to be going over ground so well known to the members who are present as to be of the nature of an unnecessary performance in recounting them. As, however, the proceedings of this evening will be reported far and wide, both in our *Journal* and in other publications, it may be desirable to mention some details which cannot but be interesting to outsiders. Mr. James Brooks, on whom Her Majesty this year confers the honor of the Royal Gold Medal, is a native of Berkshire, from the neighborhood of Wantage. He came to London about 1847 to study for our profession, and became a pupil of the late Lewis Stride, a Fellow of this Institute. That he was a diligent worker in the office goes without saying; he also attended Professor Donaldson's classes at University College, and became in due time a student of the Royal Academy, and attended the professional lectures. He commenced practice on his own account about 1852, at first — as was natural — in a comparatively humble way, but soon established for himself the career in which he has been so much distinguished, and in which he has enriched the neighborhood of London, and also many country districts, with some of the handsomest ecclesiastical structures which have been erected during the last thirty years. A complete list of these buildings would be very extensive, and lead me to a length far beyond what the occasion requires. I therefore select a very few from among the most striking examples, placing them approximately in the order of their dates, namely: The Convent Schools and Chapel of St. Michael, Shoreditch, 1863; St. Margaret's, Lee, in Kent, 1876; St. Peter's, St. Leonards-on-Sea, 1883; St. Mary's, Hornsea, 1888; St. John the Baptist's, Kensington, 1892. It is evident that much valuable study and successful practice must have preceded the first during the ten years which date from 1852 as above mentioned. And we may hope that the last-named on the list may be succeeded by a goodly following by the same hand. The style of architecture which Mr. Brooks has chosen for the majority of his churches is either the Lancet, or else the Transition into Curvilinear which succeeded it. In a few instances (one of them being the church at Hornsea referred to above) the Perpendicular style has been used very effectively. The treatment is invariably vigorous, and with a simplicity somewhat bordering on severity, particularly as respects the exteriors. This, however, is not the place to criticise, but to praise them, and they are worthy of it. Mr. Brooks's fame, no doubt, rests mainly on his ecclesiastical designs; but they are by no means his only achievements. Among his works may be cited a large brewery, an hotel, many secular buildings, two hospitals in connection with sisterhoods, extensive and sumptuous stables built for the Marquis of Londonderry, laborers' cottages, and gentlemen's mansions, one of the most remarkable of these being in South Africa. Mr. Brooks is Architect to the

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Diocesan Society of Canterbury, and is one of the consulting architects to the Incorporated Society for Building Churches. Lastly, I feel sure of having your united concurrence with me in the act of handing to our distinguished colleague this Royal recognition of his merits as an architect.

The President then presented the Royal Gold Medal to Mr. Brooks, amidst the applause of the meeting.

Mr. James Brooks said that he first wished to be allowed to express his gratitude to the President, for the kind but too flattering remarks he had made on himself and his works as an architect when presenting him with the Royal Gold Medal. The honor was also enhanced by its having been given, on the recommendation of his brother architects, Members of the Institute. The medal was annually conferred on architects and men of letters, and was wisely not confined to Englishmen. He felt most keenly his position that evening, in having to address his fellow-architects on receiving the medal, for he, unfortunately, was not an orator. His mind went back to those distinguished men, who in the past had filled the position he occupied that evening. He could mention name after name, but he did not wish to be invidious, although he felt as deeply as they could the honor which had been conferred upon him, and which would cause him to strive even more faithfully to do his work as an architect, and to leave marks of history behind him, which should not be entirely to the disgrace of the person who had left them. An architect was not like a painter: the architect's buildings stood out in their goodness or badness, and more often the latter than the former. They stood before the whole world and made history, while the painter's pictures went into the picture-galleries and other places, and were more hidden from the eye. Architects then had a duty to perform, namely, to endeavor, as far as lay in their power, to hand down their works in their humble way, as he only could hope to do, and to imitate in some slight degree those great masters who had left behind them such monuments of their skill and ability. He referred to such men as those who had designed Durham Cathedral and Christ Church, Hampshire, both built by the same architect. When he looked at those works, and studied those buildings, as he had studied Durham Cathedral and Christ Church, Lincoln, Ely, Salisbury, Hereford, Winchester, and other great buildings, as well as the great collegiate churches — which to his great regret were mostly in ruins — not to speak of the parish churches great and small, and then looked at his own poor efforts as an architect, he had felt what a gulf existed between those works and his. He could attribute many of his shortcomings to the little amount of training which existed in his time. It was true that he had at a very early age a love of invention. He could give some of his efforts in that direction, and to mention one he might say that when his father first presented him a watch he was proud and contented, but he soon got tired of looking at the outside. Wishing to see the inside, he soon found out a way to take the watch to pieces, although he found it was not an easy thing to put it together again. Not to be daunted, however, he discovered the way to do this, and from that time he regularly did the cleaning. Without the gift of invention, he would ask, how could a man become an architect, as the architect's works ought to be full of invention. Even where there was this natural gift, it could not be fruitful without systematic training and study. In his early days this great advantage did not exist. No doubt they had Professor Donaldson's lectures then, but he could not see that these gave them such insight into the complete knowledge of their art as was necessary. The Institute, however, was now offering to all young men who chose to avail themselves of it the curriculum presented for their guidance and teaching, so that they might become much more accomplished architects than they possibly could if they had to come into their sphere of life in a sort of "tumble-up way." The examination had been now divided into three classes: first, the preliminary; secondly, the intermediate; and third, the final. He did not wish to be misunderstood on this point, for he was not going to say that the examination was going to make men who had not got the genius of architects, capable architects. He was quite aware that any one might pass these examinations, but they would not qualify such a man to become an architect. It was merely the means to an end; it was only the foundation and not the superstructure. If the student did not possess the natural genius requisite, no examination could impart it to him. But to those who went through this systematic training which the Institute supplied, it facilitated the acquiring of such knowledge as an architect should possess, before he could with any success enter upon his calling. No one reaped these advantages so fully as the natural born genius, for it enabled him to obtain in a much shorter time the completion of his studies, and to make an earlier start in life on his own account than he otherwise would. By this training and the examinations the student felt some confidence in himself, and this was a great advantage over the "tumble-up way" he had to pursue in gaining the small amount of the art and science of architecture that he possessed. He was proud to receive so great an honor as the Royal Gold Medal, after the long list of medallists who had received it in former years, and of whom he was the last and the least. He had also been gratified to receive many letters from noblemen, gentlemen, and members of the Institute, which would render the medal even more valuable in his sight. At all times he had endeavored to do his duty, he had loved his profession, and had striven hard for it. This was not the only time he had received the favor of the Institute. He had, through their very great kindness, been elected year by year to the Council, although he thought it was time for him to retire, and allow some other person to occupy his position [cries of "No"]. For four years in succession they had honored him by electing him one of the Vice-Presidents of the Institute, and the medal which now hung round his neck was the last honor which they had conferred upon him. He was grateful to them for listening to a man who was not an orator, and who could only say things in a common way, but he had strong feelings, because he loved the art which he had been practising for so many years. He had been endeavoring to impress on the works that he had been carrying out for years some little originality, to show that there was some individuality in the man who had erected them. He would conclude by returning grateful thanks for their kindness in conferring this great honor upon him. — *The Builder.*

THE PROPOSED WORKS AT PHILÆ.

IN his report to the Government on the progress of reorganization in Egypt, Mr. Villiers Stuart, the Egyptologist, writes: — As connected with the subject of irrigation and the question of the projected reservoirs at Philæ, I visited this island in order to judge for myself of the effect of restoring the walls by which it was once surrounded and raising them to a sufficient height to keep out the water in case the scheme of a great reservoir at this point was carried out. I traced the foundations of the original wall in its entire circuit; it was about 700 yards in circumference. At one point there is a natural wall already, of more than sufficient height, consisting of immense granite boulders; this formation might be imitated at intervals in the new wall so as to break its formal appearance and give it a certain correspondence with Biggeh and the other islands around. Within the enclosure there would be a distance of about 60 yards between the west wall and the temple, but considerable less on the east. The chief temple faces south, and the space intervening between the façade of the great pylon and the southern extremity of the island, more than 100 yards in length, is disfigured with mounds of mud bricks, the relics of Arab and Coptic houses. This could be levelled and planted with palm groves, or converted into a botanic garden; this would form a picturesque and artistic setting both for the colonnades right and left and for the main temple itself. Thus within the enclosure, so far from the monuments being spoiled, they would, on the contrary, be set off to advantage, and rescued from their present squalid surroundings — an important improvement.

Externally, the island would lose some of its picturesqueness, but not to the extent that might be supposed, for the palm groves and the higher portions of the temple would show above the enclosing wall, and Philæ would be more assimilated to the neighboring islands. There would be nothing inconsistent with ancient traditions in the wall itself; all Egpytian temples were surrounded with high walls and embankments, and Philæ was no exception; it would be simply a restoration, but an improved one. The opposition to the scheme on the part of artists and archæologists is based on misconception; most of the opponents would be converted if brought to the spot and the effect explained.

The most important eclipse of the picturesqueness of Philæ would be while the reservoirs were full, but at that season it is not visited either by artists or archæologists, and as the level sank, Philæ would emerge uninjured in every respect.

Whether Assouan be the best point for the reservoir is an engineer's business to decide, but if it be, I have no hesitation in saying that the question of Philæ monuments ought not to and need not interfere. The monuments would benefit rather than otherwise. I say this as an Egyptologist, as jealous as any of my compeers for the conservation of every relic of the past. I met a well-known brother Egyptologist shortly afterwards who entirely agreed with me in my view. — *The Architect.*



SEVENTH ANNUAL COMPETITION FOR THE ROBERT CLARK TESTIMONIALS UNDER THE AUSPICES OF THE CHICAGO ARCHITECTURAL CLUB OF CHICAGO.

Conditions. — The competition is open to architectural draughtsmen under thirty years of age, residents of the United States, and not practising architects.

The author of each design must execute all drawings without assistance, and non-adherence to these conditions will cause the rejection of the design or designs in question.

The awards will be made by the adjudicating committee on the "Robert Clark Testimonial Competition," and are: First Prize, Gold Medal; Second Prize, Silver Medal; Third Prize, Bronze Medal.

The two designs receiving Honorable Mention will receive special bronze medals.

The three prize drawings shall become the property of the Chicago Architectural Club.

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PROGRAMME.

An Art School. — A gentleman wishing to share his large and valuable collection of paintings, statuary and architectural fragments with his townsmen, has decided to place them in a building which he proposes to erect for the study of Architecture, Painting and Sculpture.

The building is to face the town square, and is to be not more than one hundred and fifty feet in its greatest dimensions.

It shall consist of one story and a high basement.

The first story shall contain the following rooms :

1st. A large entrance gallery for the placing and hanging of statuary and paintings. This hall should be the main feature of the plan, and should be carefully arranged for convenient and advantageous display, without destroying the architectural effect. It may be one continuous hall or divided into parts, at the discretion of the architect. It may be lighted from above.

2d. A large glass-covered court to contain architectural fragments.

3d. An amphitheatre to seat about two hundred, for lectures on art subjects. A library and an assembly-hall.

4th. Four class-rooms. These rooms should be well lighted and of easy access to the court and gallery.

5th. A janitor's room and an office for the custodian. These rooms may be small, but should be conveniently either placed at the entrance to the building or to the grounds.

As the number of the students is limited, the size of the rooms is of less importance than the circulation, convenience and artistic beauty of the whole.

The building being the home of the arts, should be pure in style and classical in feeling, though not necessarily archæological.

Drawings required, viz : — One plan and one section at the scale of one-sixteenth of an inch to one foot, and the front elevation at the scale of one-eighth of an inch to one foot.

Drawings to be rendered at will; to be mounted on strainers, 28 x 40, without frames or glass.

A sealed envelope containing the name and full address of the author, with place and date of birth, must be *securely fastened to each drawing*; the drawing and envelopes themselves must not be marked by a device of any kind.

Drawings must be delivered to John Robert Dillon, Secretary, Chicago Architectural Club, at the Club-house, 274 Michigan Ave., Chicago, on or before *Friday*, November 15, 1885, charges to be prepaid. All drawings not receiving prizes will be returned at the expense of the contributor.

L. J. Millet, *Chairman*,
R. C. Spencer, Jr.,
Irving K. Pond,
Adjudicating Committee.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF FRANCIS D. LEWIS, ESQ., WISSAHICKON HEIGHTS, PHILADELPHIA, PA. MR. R. G. KENNEDY, ARCHITECT, PHILADELPHIA, PA.

[Heliochrome issued with the International and Imperial Editions only.]

A DOUBLE COTTAGE: THE DINING-ROOMS. MR. R. BROWN, JR., ARCHITECT, BOSTON, MASS.

THE window and fireplace show the treatment of the interiors in the dining-rooms of the double cottage illustrated in No. 1019, July 6, 1895. The window-sill is about four feet from the floor and is wide enough to form a shelf for plants and flower-pots. The height of rooms is eight feet six inches from floor to underside of beams. The wood used in the finish would be either Canadian ash or American oak, stained a greenish color or a "broken" color of green and brown in the figure of the wood. The frieze is intended to be of coarse canvas painted in colors. The patterns of the fire-dogs and fire-back, which would be of cast-iron, are adopted from Old English ones.

DESIGN FOR MEN'S GYMNASIUM FOR MASSACHUSETTS GENERAL HOSPITAL CORPORATION, WAVERLEY, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.

THE ENTRANCE COURT, PLAS MAWR, CONWAY, WALES.

HOUSE FOR W. B. ROTHSCHILD, ESQ., HARTFORD, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

STAIRCASE HALL OF THE SAME.

"HADDON HALL," BERKELEY ST., BOSTON, MASS. MR. J. P. PUTNAM, ARCHITECT, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

WINDOW OF HÔTEL, RUE HAMELIN, PARIS, FRANCE. M. GUINOT, ARCHITECT.

[Copper-plate Photogravure.]

DETAIL OF THE SAME.

[Copper-plate Photogravure.]

DETAILS OF CHURCH FURNITURE IN THE MARIENKIRCHE, OSNABRÜCK, PRUSSIA.

This plate is copied from the *Zeitschrift für Bauwesen.*

WELL IN THE COURT-YARD OF THE CASTLE AT GEHREN, THURINGIA. BERNARD SCHÄDE, ARCHITECT.

This plate is copied from the *Deutsche Bauzeitung.*

BUFFET IN THE RESTAURANT, PARLIAMENT BUILDING, BERLIN, PRUSSIA.

This plate is copied from *Innen-Dekoration.*

FIREPLACE IN THE HALL OF THE SKINNERS' COMPANY, LONDON, ENG.

From an artistic and archæological point-of-view the "Cedar Room" is the most important existing feature of the Hall of the Worshipful Company of Skinners in Dowgate-hill, and the silver-plate possessed by the same ancient and historic City Guild, may be described as among the most valuable and interesting collections existing in London. We illustrate to-day the beautifully-carved chimneypiece which gives so much character to this "Cedar Drawing-room."

The Skinners' Hall was rebuilt after the great fire, and was refronted in 1790 by Jupp, who introduced the arms of the Company into the pediment of his façade, and enriched the frieze with festoons and leopards' heads. The drawing-room, which is lined with odoriferous cedar, was restored by George Moore, F. R. S., and the ornament is picked out with gilding tastefully managed, making, as Hare says, "one of the noblest old rooms in the City." The dining-hall is entirely modern, in a sort of Italian style, and lighted by sky-lights. At the end is a gallery for minstrels, with an Ionic treatment for the front, also designed by Moore. The old Georgian oak staircase, and the "oak parlor," are both good examples of Late Jacobean English woodwork, dark with age, and good in proportion and style. In the court-yard stand four handsome ancient lead cisterns, somewhat like that at the Brewers' Hall. The principal doorway has a curved hooded pediment supported by pilasters carrying acanthus-leafed trusses, said to date from the time when the hall was rebuilt, immediately after the great fire. The portrait of Sir Andrew Judd, Lord Mayor in 1551, and founder of the Tunbridge School, managed by the Skinners' Company, hangs in the staircase-hall above the wainscot panelling. His tomb is in Great St. Helen's. The Skinners' well, near the Clerk's well, situated in Clerkenwell, marked the site of much of their property, and here it was that the Skinners of London acted Holy plays, one of which, in 1408, lasted eight days, and was "of matter from the creation of the world."

The Skinners were incorporated in the first year of Edward III, 1327, and became a brotherhood in the reign of Richard II. No less than about thirty Lord Mayors have been chosen from this company. They have included among the membership of the Guild six kings and five queens, to say nothing of princes, dukes, earls and barons. James I granted the existing charter. The Skinners, proud of their antiquity, disputed with the Fishmongers for precedence in 1339, and a serious skirmish ensued. The ringleaders in the affray were seized by the municipal authorities; but the mob rescued the prisoners, and the mayor, with his officers, were maltreated. "These desperate fellows were apprehended, tried and condemned at the Guildhall, and executed in Cheapside, the king granting an indemnification to the mayor." Strype says that the Skinners in his days, "removed to Budge-row and Walworth." In 1395 they seem to have been located in St. Mary Axe.

This plate is copied from *Building News.*

THE GREAT BRESLAU PUMP, NEISSE, SILESIA.

There are few instances of the smith's craft even in Germany which will compare with this Silesian pump-case, standing in the Breslau Grand Strasse, at Neisse. Although dated late in the seventeenth century, it is a thoroughly traditional piece of work, and in some ways may be said to be even mediæval in the spirit of its design. The quaint freedom adopted by the smith as he introduced the many little grotesque conceits which enliven the foliations of the scroll-work exhibit a gaiety and delight on the part of the artificer which distinctly adds to the individuality of his production. An inscription is carried round the central band of the structure, just above the level of the head. The Imperial Eagle, surmounted by a crown, serves as a finial to the composition, and rises in an effective manner over the bunched-up scrolls, into which the inclosing framework of the domical roof-lines of the cage are developed. The curves throughout the design are graceful and well distributed, with a due regard to scale. The drawing which we publish is reproduced from Mr. Ernest Wasmuth's "Denkmäler Deutscher Renaissance," a work of artistic thoroughness and utility. The base of the pump at Neisse is constructed of stone.

This print also is copied from *Building News.*

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THE CHURCH OF THE GOOD SHEPHERD, GOSPEL OAK, LONDON, ENG. MESSRS. JAMES BROOKS & SON, ARCHITECTS.

BELIEVING that the character of the work of the recipient of this year's Royal Gold Medal is not known to many architects in this country, it seemed to us worth while to reproduce, after the *Builder*, this week, this and two other specimens of his work, specimens which are fairly characteristic of the simplicity and purity which have always marked it.

ROOD-SCREEN, ST. JOHN THE BAPTIST, KENSINGTON, ENG. MESSRS. JAMES BROOKS & SON, ARCHITECTS.

THIS screen is built in Borstain stone, the figures being in Corsham. The subjects of the top figures are as follows: — The centre one, the Crucifixion, with our Lady and St. John on either side; on the four columns are the archangels; and between them are three angels holding their tapers; below the figure of the Crucifixion are the three Prophets. In the niches below the central figure is our Lord sitting on His throne in glory, and the twelve Apostles on either side; of the four spandrels below, two have elaborate but simple carving, whilst in the other are two angels holding censers.

The whole work is lofty on account of the great height of the church. The Crucifixion is well up into the chancel arch. The gates are not fixed, they are being made at the present time; they will be in wrought-iron work, heavily gilded. An elaborate reredos has been erected in this church; the whole of the panels being filled with paintings, all of which represent the Adoration of the Lamb.

This plate is copied from *The Builder*.

NAVE OF CHURCH OF ALL HALLOWS, GOSPEL OAK, LONDON, N. W., ENG. MESSRS. JAMES BROOKS & SON, ARCHITECTS.

THIS drawing of the interior of one of the finest of his recent churches was specially prepared for publication in the *Builder*.

The drawing, as will be seen, gives a view in the centre of the nave looking towards the east end. The effect of the development of the vaulting-ribs from a circular pier, without the interposition of any cap or impost moulding, is well shown in the drawing, and though we are not prepared to see the cap or capital discarded altogether in works in the Gothic style, there is an expression of constructive unity and simplicity in this treatment which is very satisfactory.

The church is being erected in Ancaster stone, with a core of Portland stone cement concrete. The width of the church within the walls is 64 feet, the length of nave and north and south aisles is 96 feet, chancel 42 feet 6 inches long, the north and south aisles 37 feet. The south aisle is fitted up to be used as a chapel, having a separate entrance out of a small aisle or passage. Owing to the great fall of the ground from west to east a crypt has been formed under the north and south chancel aisles and under the chancel, giving a parish-room under the north chancel aisle, a choir vestry under the south chapel, and a large vaulted clergy-vestry under the chancel. At the east end of the chancel are two octagonal turrets having staircases leading up to the gutters and for repairs of roofs. At the west end are two square turrets. The nave has five bays, the chancel three. All parts of the church, chancel and aisles, are groined in stone springing from and growing out of cylindrical shafts, 2 feet 8 inches diameter, the springing being 28 feet from the level of nave floor. Owing to the great thrust of the groining the buttresses project 7 feet from the external face of the wall, and are carried up without any weathering for about 20 feet, and then have a gentle slope to about 3 feet of the wall. The accommodation is for nearly 1,400, and the approximate cost is about £18,000.

LONDON SCHOOL-BOARD OFFICES, VICTORIA EMBANKMENT, LONDON, ENG. MESSRS. BODLEY & GARNER, ARCHITECTS.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

DAMAGES FOR DELAYS.

BROOKLYN, N. Y., July 8, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Your kindness in advising the undersigned in regard to the following matter, through the columns of *The American Architect*, will be greatly appreciated.

The owner of a residence situated in the centre of a large and valuable lot decided to move the building to a corner of the lot, thus rendering available for sale four valuable building lots.

The mason's contract, which was made separate, provided that the contractor should complete his work by a certain day, otherwise he should pay the sum of ten dollars for each day thereafter as liquidated damages. On account of severe weather the work was inevitably delayed much beyond the agreed time. However, the contractor failed to provide certain stone necessary to complete the work, and so caused the premises to remain in an uncompleted condition for several weeks after he was notified in writing that the forfeit would be imposed.

Now, the owner entered the premises before the work was completed, but the source of damage is held by the owner to be in the unsightly and unfinished condition of the general premises (the failure of the contractor to provide this stone preventing other contractors from completing their work), thereby causing his lots to remain in an unsalable condition and in a condition unfit to offer for sale.

Though the forfeit of ten dollars per day was included in the signed and sealed contract, no mention was made therein of any premium to be paid in case the contractor completed his work in advance of the agreed time.

Do you consider the forfeit to be collectable under the circumstances? Yours very truly, HERBERT R. BREWSTER.

[THE question whether damages could be collected would be determined mainly by the language of the contract. On general principles, it seems to us that the loss of sale of the land, on account of the delay in clearing up the rubbish incidental to the contract work, would be a damage too remote and uncertain to be collected under an ordinary builder's contract. The point may perhaps be put thus: Was the mason told, or would he reasonably have supposed, when he signed the contract, that he would be held, if he delayed its completion, for the loss of sale of the land on which the building was situated? If not, it would be difficult to make him now liable for such loss, particularly as the loss, if any, seems to have been due in part to the owner's or other contractors' delays. — EDS. AMERICAN ARCHITECT.]

EXHIBITIONS

BOSTON, MASS. — *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

TO UTILIZE THE NILE CATARACTS. — M. Prompt, the Inspector-General of Roads and Bridges in Egypt, has proposed to utilize the motive power of the Nile cataracts. He would begin with founding an electrical station at Assouan, where there is a fall of forty-five to fifty feet, from which 40,000 horse-power might be drawn. A second fall could be created by a dam near Cairo fifteen feet in height. With the electrical power thus obtained he would light the City of Cairo and establish a large number of cotton factories. Moreover, he would also utilize the water for irrigation, and the cultivation of sugar-cane and cereals. The cost of the works would, he thinks, be under £2,000,000, and they might be executed without any subvention from the State. — *London Globe.*

METAL-DECORATED GLASS. — M. Margot has taken advantage of the singular fact that aluminium, zinc and magnesium, when fused, will adhere to glass, in order to introduce a new style of decoration — namely, glass coated with these metals. The pure metals require a very high temperature to melt them; for instance, 1,112° Fahrenheit in the case of aluminium, but M. Margot has found that alloys of the metals possess the same property. An alloy of 90 parts tin and 10 parts of aluminium melts at 662° Fahrenheit, while an alloy of 95 parts tin and 5 parts of zinc melts at 392° Fahrenheit. Both of these alloys have a fine, untarnishable lustre. Moreover, one can actually solder glass with them as easily as one solders two metals, either by warming in an oven the two surfaces of glass to be united and applying the solder as one does sealing-wax, or with the ordinary soldering iron. — *The London Globe.*

FIRE CAUSED BY AN INCANDESCENT LAMP. — Several hotel men were standing in a group in an uptown hotel recently, chatting. The conversation turned upon the eccentricities of guests. The many odd ways in which different people handle electric lights came up, and one hotel man said: "Nearly every one now knows how the incandescent-lamp is operated, but still we meet with some funny instances of ignorance. Last week we nearly had our hotel set on fire on account of a piece of stupidity on the part of a guest. The building being fireproof alone prevented a conflagration. A woman came to the house who was in the habit of sleeping with a dim light in her room, and the electric lamp bothered her. She either had to let it burn brightly, or else turn it off altogether. Finally she hit upon the idea of wrapping a towel around it. Then she began to question whether the towel would catch fire. Then she adopted the happy expedient of wetting the towel. That was the worst thing that she could do. She soon dropped asleep, and of course the towel soon began to burn. A blazing piece dropped on the curtains, and soon the whole room was afire. She was badly scared, and, of course, the contents of the room were ruined. — *N. Y. Tribune.*

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The Sanitation of the Roman Campagna. — Dr. S. W. Abbot translates as follows from the *Giorno del Genio Civile* for 1893: The malarial character of the Pontine marshes has been known for centuries. The region has become deserted on account of its poisonous exhalations, due to imperfect drainage, and the peculiar character of its undulating volcanic soil. Soon after the unification of the Kingdom of Italy, the reclamation of this region began to receive careful consideration from the Government, and various measures were proposed to remedy the evil. At one place, plantations of eucalyptus trees were made, which proved a failure so far as an effectual amelioration of the miasma was concerned. The drainage of the soil finally was believed to be the proper remedy, and the work was entered upon soon after the enactment of a law of 1878 providing for the carrying out of the scheme. The basin, fringing the ancient, but now disused southern arm of the Tiber estuary, on which once stood the City of Ostia, contains a low-lying tract having the following area:

a. Permanently submerged	1,690	Acres
b Inundated in winter	768	"
c. Saturated and useless	2,008	"
d. Higher ground, fairly dry	227	"

A total of 4,693 acres, or about 7 1-3 square miles.

The upper levels are to be drained by gravitation, and the lower areas by pumping. The high-level drains comprise a total length of nearly 79,000 feet. Two engines pump the water of the low levels. The pumps were started in December, 1889, with the water about twelve inches above the marshes; and after 116 hours of intermittent working, the water-level was reduced over the whole marsh 19½ inches. After this the work was continued at different times till the water-level was reduced six feet lower. The average working period is 1,200 hours per year. The cost of the whole works, including working expenses and maintenance, has been about $115 per acre.

Circumstances alter Cases: a Tale of Co-operation. — A coal mine at Monthieux, near St. Etienne, in the Department of the Loire, was abandoned by its owners several years ago because it could no longer be worked at a profit. The discharged miners finding themselves without work, formed a coöperative concern and obtained a title to the abandoned mine. They then set to work and by opening new veins, by observing strict economy and unflagging industry, made the mine pay. Now note the result. The mine-workers in the neighborhood, engaged with their employers in an eternal wrangle over wages, sought, and in many cases secured, employment in the coöperative concern. The founders of the latter, however, would not admit the new-comers on equal terms with themselves. When it came to the question of wages, for instance, they would not pay to the new men the same rates that were paid to the men who, by extraordinary efforts, had turned a worthless hole in the ground into a paying piece of property. When the new miners resisted and created a disturbance, the aid of the police was invoked and the disappointed element was dispersed. No doubt they looked upon themselves as the victims of capital and the slaves of a mushroom bourgeoisie. To an outsider it only illustrates that thrift, industry and perseverance lead to success, and that men exhibiting these qualities are not likely, whether wage-earners or capitalists, to allow shiftlessness and indolence to run away with the fruits of their labors. — *N. Y. Tribune.*

Chemical Tests of Water. — Physicians are now generally of the opinion that impurities of organic origin are alone the dangerous element in drinking-water, and that by far the greatest risk to the health of the community is incurred by using water containing certain living organisms which are capable of producing specific effects when introduced into the alimentary tract. An argument employed with much plausibility in this connection is that the presence of organic matter can be most certainly demonstrated by chemical analysis, but by this means it is impossible to demonstrate whether the organic matter contains living organisms. All organic matter, it is well understood, does not contain them, so that a chemical analysis of water alone is misleading. It is further argued that they can most certainly and accurately determine the chlorides, nitrates, phosphates and ammonia of organic matter, and of the amount of oxygen consumed, all of which is of great importance as an index of the purity or the impurity; thus, water from some sources might contain excess of nitrates and mean nothing, while another sample containing less nitrates and from a different source, might be unfit for use. Extraneous conclusions may also be drawn from the determination of oxygen consumed and of albuminoid ammonia. — *N. Y. Tribune.*

To reproduce the Court of Honor in Marble. — A meeting of the World's Fair Directors was called recently. The notices were cancelled, however, and the meeting postponed until Fall. If the Directors consider favorably proposals that will be made, Director James W. Ellsworth said, in positive terms, an impetus would be given to a project for the reproduction of the Court of Honor of the World's Fair on the lake front. An expenditure of $10,000,000 will be necessary, and of this amount, he says, $450,000 has already been promised by two persons. "I am not at the head of the movement to reproduce the glories of the Court of Honor," said Mr. Ellsworth, "but I am largely interested in it. A few of us have got together and looked deeply into the practicability of the project. We have seen D. H. Burnham, architect of the Fair, and obtained from him close estimates of the cost of rebuilding in white marble the structures which lined all four sides of the great basin. We have included the Administration Building at one end and the Peristyle at the other. The cost of the MacMonnies Fountain recast in bronze and of the statuary on the banks of the basin in the same material has been included, and it is found that $10,000,000 will cover the cost of everything." — *Chicago Tribune.*

Changes in Old Palace Yard, London. — It is announced that the negotiations for acquiring the houses in Old Palace Yard, Westminster, the removal of which was unanimously recommended by the Royal Commission on Westminster Abbey, on the ground that they "not only attempted to conceal to a great extent the architecture of the chapel of Henry VII and the ancient chapter-house, but are also a constant source of danger to the Abbey from fire," are now practically completed. The price to be paid to the Ecclesiastical Commissioners for the freehold was agreed upon some months ago; and the only leaseholder who was unwilling to dispose of his interest on the terms proposed has consented to refer the matter to an arbitrator. According to the present outlook, the authorities will be in a position to begin operations almost immediately; but, as it is undesirable that the work of demolition should be begun while Parliament is sitting, things will probably be left as they are until later in the year. As soon as the houses have been removed, the space cleared will be turfed over, so that the public may be enabled to view Henry VII's chapel and the chapter-house under favorable conditions, and form an opinion as to the advisability of utilizing a part of this space for the erection of a monumental chapel, as has been suggested by Mr. Yates Thompson. — *N. Y. Evening Post.*

St. Peter's, London. — On June 29, Cardinal Vaughan laid the corner-stone of the new Catholic Cathedral, at Westminster. The site of building, which is to cost £150,000, is in the rear of the Ashley Gardens. The late Cardinal Manning declared that so long as there were poor people in London without roofs over their heads, he would build no cathedral in the English metropolis. A different spirit, however, has animated his successor in the See of Westminster, and soon after he became Archbishop he started a movement to erect a great minster there. Last summer, when half of the necessary money was subscribed, the designs for the structure were adopted, and the time for laying the corner-stone was fixed to take place on St. Peter and St. Paul's day. The Roman Catholic Cathedral of St. Peter, as it is to be called, is to be a basilica, on the general lines of Constantine's Church of St. Peter, at Rome. The interior is to be 350′ long, 170′ wide, 100′ high, and to seat 8,000, with standing-room for 2,000 more, and a monastery for seventy-five inmates, which it is designed to invite the Benedictines, who for centuries owned Westminster Abbey, to occupy. The Duke of Norfolk contributed £20,000 to the fund for the erection of the Cathedral, and it is provided that all persons giving £1,000 or more shall have their names inscribed on the building. — *Philadelphia Telegraph.*

Building a Levee with Force-Pumps. — Captain George McC. Derby, the able young engineering officer who has charge of the Federal engineers in this city, yesterday announced that the attempted feat of building a levee with force-pumps on the great dredge, the "*Ram*," was successful. Captain Derby, believing that levees could be built by this means, attempted the experiment on the levee at Nine-mile Point, opposite Carrollton. Captain Derby cannot state yet what the real result of his experiment exactly is, as the present attempt was made with a view to discover a method rather than to avoid expense. Four attempts were made by the engineers. The levee existing at Nine-mile Point before the "*Ram*" went to work was of small section and low height. It was desired to enlarge it to a size almost as great again as it then was. The "*Ram*" was stationed about 400 feet away, and the piping was laid to the work, so as to permit the pumps to send a stream of sand and water, scooped from the river bottom, to the work. This stream was delivered at a height of about ten feet, and the volume of water was so great that the consistency of the mass was very thin. Captain Derby first threw up a small levee behind the original one, and attempted to fill-in the space between the two. It was found that the silt was readily deposited, while the water ran off, leaving a thick, heavy mass of solid earth. As soon as this topped the rear embankment, an effort was made to raise the barrier by increasing its height from the deposit made from the pumps. The material was, however, too dense and glutinous to be worked fast enough, and a crevasse occurred. This method was then abandoned. A framework of laths, covered with jute bagging, was substituted for the small rear levee, it being thought that the water would pass readily through the bagging and the silt be retained. The result was fairly satisfactory, but very expensive. Planking was then substituted on timber frames, but the stream ate out the toe of the framework and the fluid escaped. The last method was very ingenious. It was found both cheap and efficient. Captain Derby took a plank one foot wide and pinned it on edge about twelve feet away from the toe of the old levee. The board was driven a small distance into the turf, in order to prevent the material from seeping under and escaping. The pumps were started, and in a few minutes a terrace was formed as high as a board, the water escaping over the board. Then a second board was set on the terrace a few feet nearer the old levee. This, too, was filled in, forming a second terrace. It was found, however, that when each terrace was filled up entirely to the height of its defending board, a crevasse was likely to occur when the next terrace was built, and the work ran grave chances of being demolished. Captain Derby obviated this by leaving four inches of each terrace unfilled, thus forming between the toe of the upper terrace and the board defending the outer edge of the lower terrace a sort of cup, into which the overflow from any subsequent crevasse was caught and held. This method was found to work perfectly. Of course, in an enterprise of this kind, its practicability depends on the cost per yard of work done by the dredge. The "*Ram*" is very powerful, having been built under contract to deliver 300 cubic yards of material 300 feet distant from the dredge every hour. In practice it was found that she could deliver about 2,000 yards per working-day of ten hours. The total cost per cubic yard of a levee built by the "*Ram*" to a height of ten feet will be 3.91 cents per yard. Hitherto the price of levee work has ranged from 10 to 12½ cents, on an average, per cubic yard. — *New Orleans Picayune.*

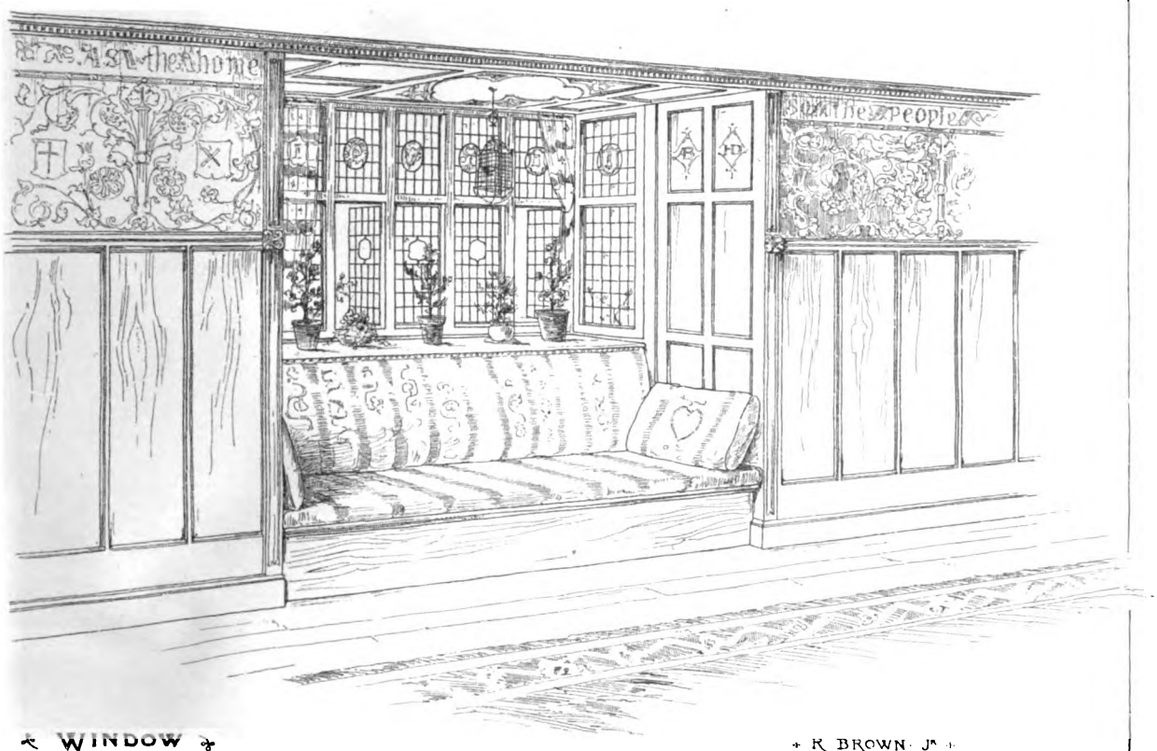
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A DOUBLE COTTAGE

THE DINING ROOM



WINDOW

R. BROWN, JR.
ARCHITECT



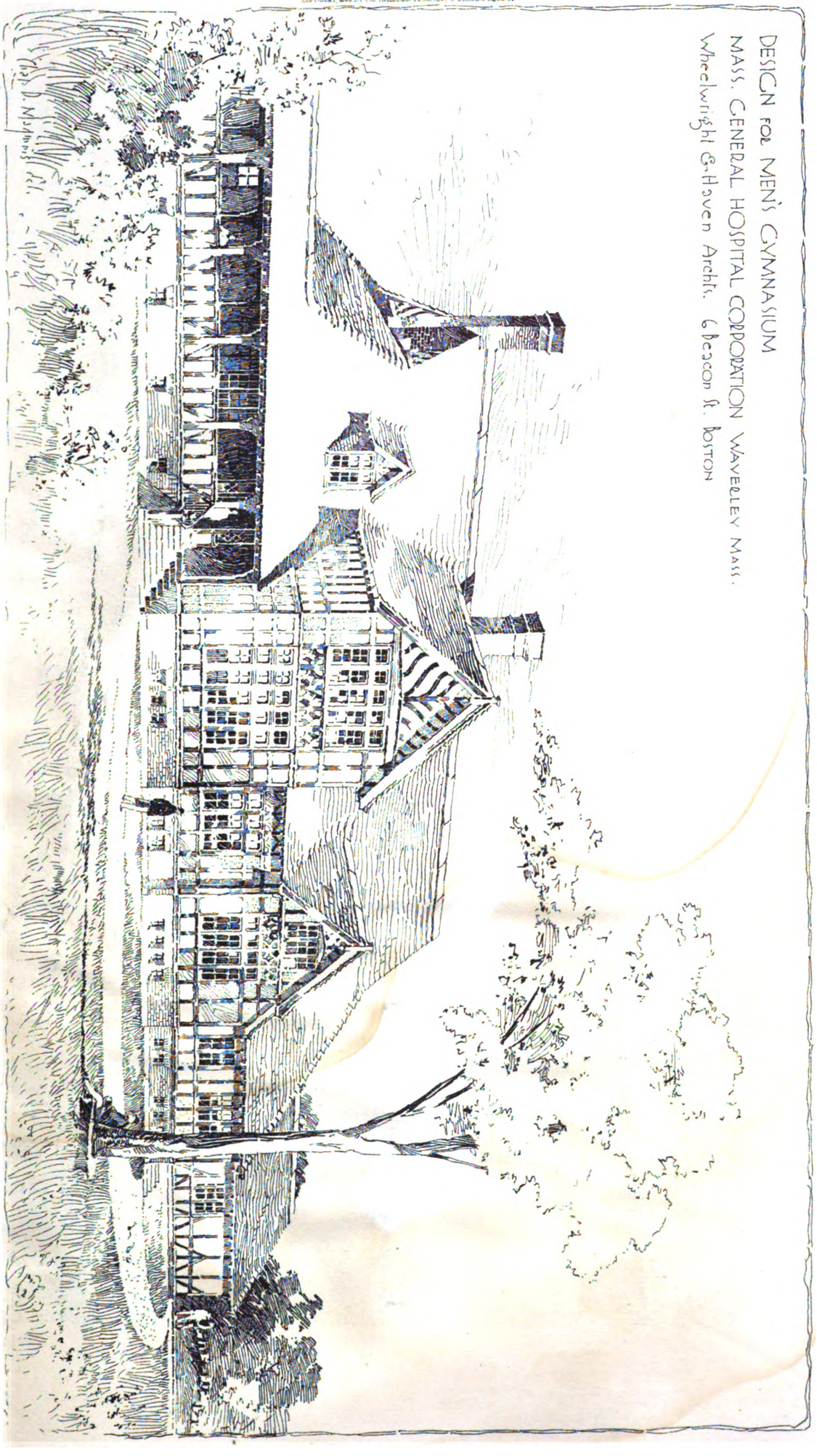
FIREPLACE

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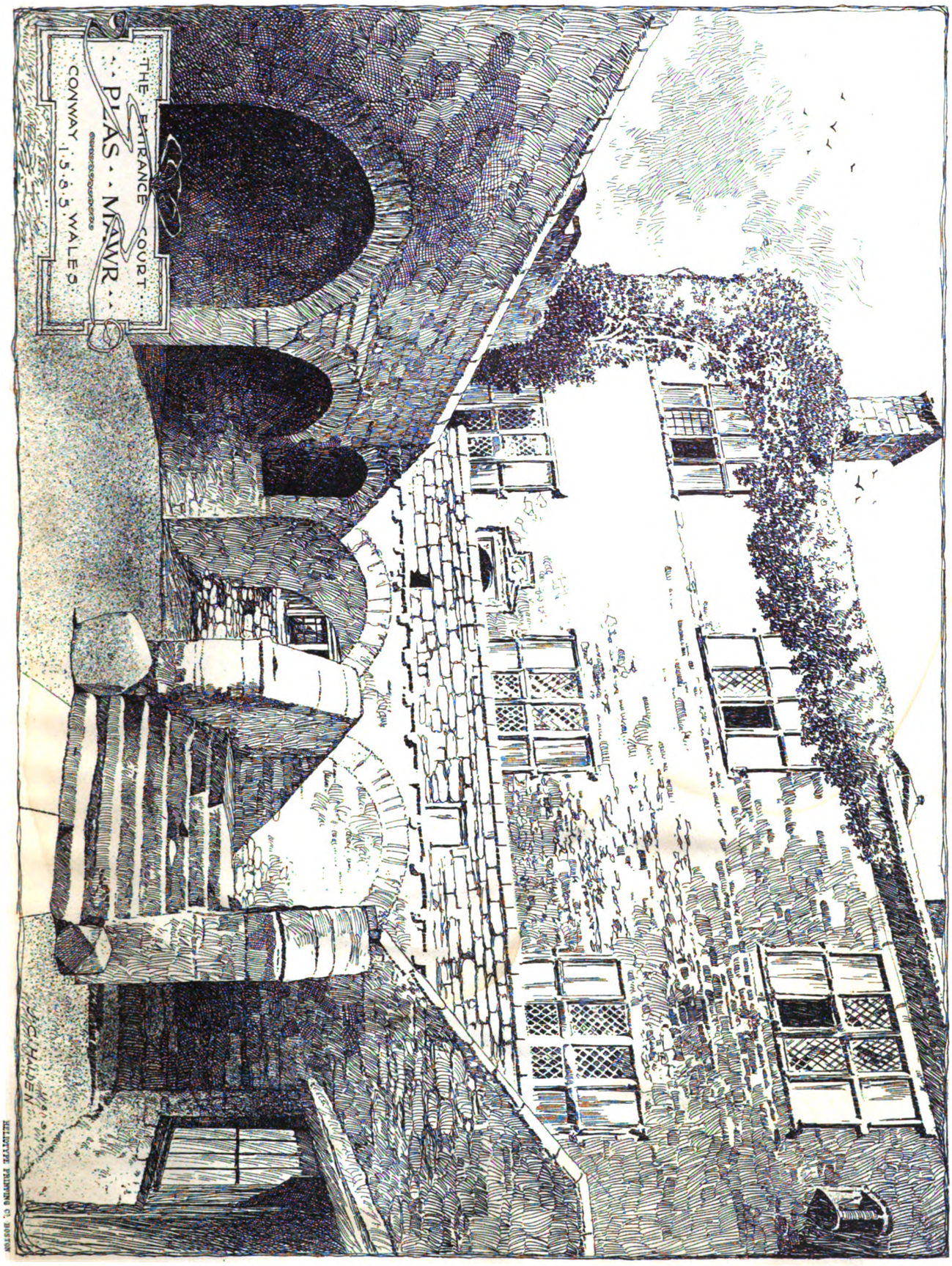
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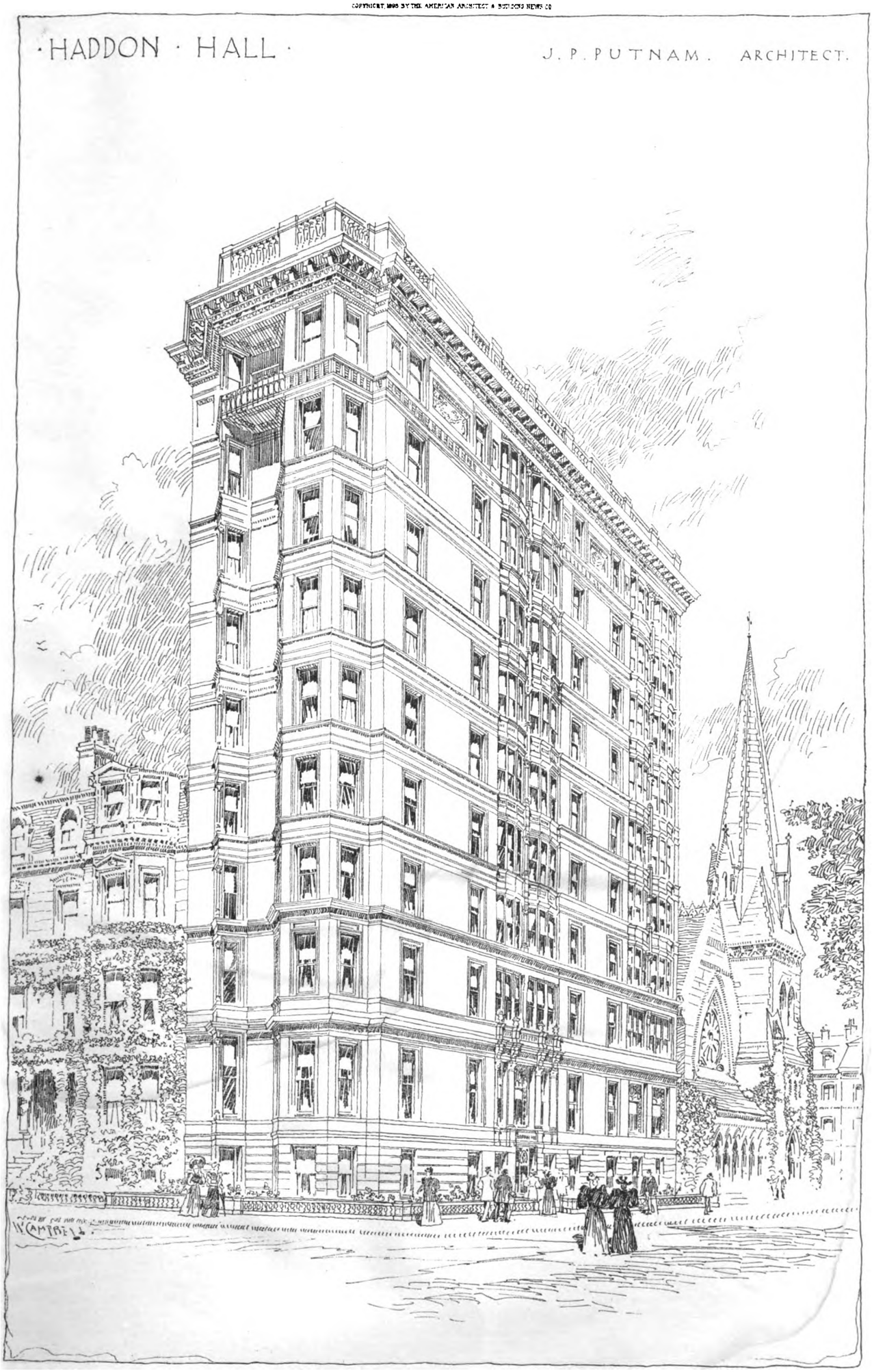
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THE profession of architecture, not only in this country, but throughout the world, has suffered a great loss in the death of Mr. Richard Morris Hunt, which occurred at his country house at Newport on Wednesday. Mr. Hunt was born in Brattleboro, Vermont, October 31, 1828, of a distinguished family. The sons of this generation seem to have been endowed with artistic talent in a remarkable degree, for a brother, the late William M. Hunt, became one of the most noted painters that this country has ever produced. Richard, while yet a very young man, was sent to Europe to complete his education, and, while there, was taken with a fancy for architecture. With characteristic energy, he prepared himself for entrance into the School of Fine Arts in Paris, remaining there for about seven years, under the great Lefuel. On leaving the School, he travelled extensively, and, returning to Paris, was invited by Lefuel, who was then engaged in building the wings connecting the Tuileries and the Louvre, for the Emperor Napoleon III, to become his assistant. He accepted the invitation, and is reputed, according to the tradition among New York architects, to have designed many of the details of the building, including the entrance archway from the Rue de Rivoli to the court-yard. At this time, Hunt was much more a Frenchman than an American. At the time that he entered the School of Fine Arts, he was, we think, the only American in the School, or, at least, in the Department of Architecture, and he was identified with French architectural design, and French architectural practice, until his work on the Louvre was finished. Returning then to America, he was employed for a time by Dr. Walter on the extension of the Capitol at Washington, and then entered into practice on his own account in New York. Although comparatively rich, both by inheritance and by marriage, he worked assiduously and ardently in his profession, and designed and carried out an immense number of fine buildings. In New York, those which occur to us at the moment are the Lenox Library, on Fifth Avenue, the *Tribune* Building, on Printing-house Square, the W. K. Vanderbilt house, on Fifth Avenue, the Osborne house, on Park Avenue, a hospital near Third Avenue, the Marquand house, and many other dwelling-houses, besides several mercantile buildings on Broadway and elsewhere; and the pedestal to Bartholdi's Statue of Liberty; besides the Vanderbilt Mausoleum, on Staten Island, and a large number of monuments. In Newport, he built many splendid country houses, including the so-called Marble Palace, belonging to Mrs. W. K. Vanderbilt, and the magnificent Goelet house, reputed to have cost a million dollars. In Boston, his work is represented by the two Brimmer houses on Beacon Street. At Asheville, North Carolina, he was engaged, at the time of his death, in the completion of an immense house for another of the Vanderbilt family. In the assignment of the work for the Chicago Exposition, he was given the principal place, by being asked to design the Administration Building, and all the world knows how he succeeded. Before that time, however, his great talents had long been recognized in the profession. He had been repeatedly elected President of the American Institute of Architects, to whose interests he devoted the most earnest and wise attention, both in office and out of it; and was decorated many years ago with the cross of the French Legion of Honor. Later, the French, who seem to have followed his career with an affectionate interest, which was fully returned on his part, raised him to the highest honor that could be bestowed on a foreign architect, by making him Corresponding Member of the Institute of France, in the Section of Fine Arts; and similar honor was recently done him on the other side of the Channel, by the Royal Institute of British Architects, in the award of the Royal Gold Medal.

THE hearts of those who desire to have the Massachusetts State-house replaced by their own or another's work have been warmed this week by the appearance on the east wall of a crack of some magnitude, which has obviously been caused by the dilatory manner in which the underpinning of the north wall of that wing has been carried out. That the crack has appeared can hardly be held a good advertisement for those who have brought it into existence. The architects of Boston are used to looking out for the pecuniary interests of their clients and it is not supposable that any one of them feels that any contractor who is desirous of securing contracts in their offices hereafter would be wise in announcing his inability to underpin such a wall as the north one of the State-house. It was Wm. M. Tweed and Peter B. Sweeney, we believe, who once delivered themselves of the two now notorious expressions: "What are you going to do about it?" and "The Public be damned." To judge by the frequency with which those interested in the building express themselves in the daily papers, there would seem to be a belief prevalent that every one who is connected with the State-house alterations is asking the same question from the same standpoint. It is a shame and a disgrace that any such public feeling should be allowed to exist, when it is so easy to dispel it, and it is really time for those in charge of the work to state categorically and over their own names, that the fears that the public certainly do entertain are not based on tenable premises. The men on whom it is most incumbent to do this are the three public servants, the Commissioners, who cannot be suspected of having any pecuniary interest at stake. The facts are obscured by a great amount of useless newspaper discussion and the air ought to be cleared by a plain official assurance, that the perfectly possible work they have been empowered to do shall be carried out without injury to the old building, which they are not authorized to injure or undermine.

IT is proposed in New York to limit by statute the height of all buildings, including office-buildings, so as to bring them within reach of the streams from fire-engines. In their present condition, the upper stories of some of the high office-buildings could never be reached by a stream of water from the outside. So long as they are used simply for offices, the accumulation of combustible material in them is not likely to be great enough to cause the destruction of structures built, as these are of incombustible materials, combined so as to protect each other, and planned in such a way as to subdivide the space contained in them, by fireproof partitions, into very small portions; but there can be no question that, sooner or later, many of the buildings now used for offices will have to be let for storage, or for some kind of mercantile business requiring the piling-up in the rooms of large quantities of goods; and from that moment they will be exposed to serious danger from fire. It is evident that, supposing only a single story in such a structure to be filled with inflammable goods, a fire among them, serious enough to cause the perforation of a few of the floor-arches, or to allow the flames to reach the elevator-well, or staircase, would convert the whole structure into a furnace, perhaps three hundred feet high, supplied with air at the bottom, and enclosed above. Such a furnace, on a small scale,

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would be powerful enough to reduce iron from its ores, or calcine limestone; and it is hardly to be expected that any combination of building materials could be made to resist it. No doubt, a destructive fire in a structure of that sort would discourage the practice of building them; but it is not always desirable to wait for such arguments.

EVERYTHING points to a great increase in building operations in the near future, all over the country. In New York, which, as the centre of business, feels very promptly improved general conditions, the amount of building is already enormous. The number of permits for the erection of new buildings during the past six months is almost exactly twice as great as the number issued during the corresponding part of 1894, and the proportion between the intended cost of the buildings for the two periods follows nearly the same ratio. Meanwhile, the number of permits for alterations has not very much increased; showing that the hesitating season of alterations, which usually precedes a time of confident and extensive building, is nearly over, and that New York, at least, is entering on a new era of development. How soon its example will be followed by other cities remains to be seen; but nothing is more certain than that the prosperity of one part of the country means the prosperity of all; and local conditions can only in a slight degree delay or modify the change which building interests have for the last few years looked and hoped for.

ONE of the correspondents of *La Construction Moderne* has been staying in Geneva, and makes some interesting observations about that famous town. Considering that Geneva had, at the beginning of this century, only twenty-five thousand inhabitants, and that it has now less than eighty thousand, it must be acknowledged that it has earned an exceptional reputation for science and learning of all sorts. Not to mention Rousseau, Calvin, the Prisoner of Chillon, the heroes of the *Nouvelles Génévoises*, and the other miscellaneous lights of ancient Genevese history, the present century has drawn from Geneva an extraordinary number of men who have won fame in science, art and literature, not only at home, but abroad. The French are not very much disposed to bestow their highest honors on strangers, yet few artists have won greater distinction in France than the sculptors, Pradier and Chaponnière, or the painters, Galland and Giron, all of whom came from Geneva; while the celebrated Prime-minister of the Republic, Tirard, is also a native of the sober little Swiss town. In endeavoring to account for the conspicuous position of Geneva in the intellectual world, our author observes that its inhabitants seem to be possessed with a passion for instruction, such as hardly exits anywhere else in Europe. Small as it is, Geneva boasts a University, with eight hundred students; a College, corresponding exactly to the French *lycées*, and now four hundred years old; a female college of the same rank, where girls are fitted to pursue, by the side of their brothers, the courses of the University; a School of Fine Arts, whose graduates take a high rank in the artistic world of Paris; a Conservatory of Music, with nearly a thousand pupils; an Academy of Music, for instruction in the higher arts of composition; and a large number of special technical schools, such as the Industrial School, the School of Drawing, the School of Watch-making, the School of Commerce, the School of Applied Arts, and so on. Besides these, the place swarms with learned societies. Beginning with the National Institute, which is planned on the model of the Institute of France, but with the difference that the number of members is unlimited, the list includes historical, geographical, archæological, artistic and other societies, almost without number.

THIS would seem to be a tolerable equipment for a town of eighty thousand inhabitants, but the half has not yet been told. During the winter, free lectures are given every evening in the great hall of the University, by some of the most distinguished men in Europe, on a variety of subjects of interest to the learned. In this hall Raoul Pictet showed his fellow-townsmen the experiment, never performed before except in his own laboratory, of the solidification of hydrogen gas into a metal; here Taine first delivered his lectures on the *ancien régime;* and here François Coppée read several of his unpublished works; and the lectures given in it are listened to by an audience which often waits in the street an hour for the doors to be opened. At the same time, lectures are frequently given in other halls, under the auspices of some of the learned societies, which attract equal crowds. The Hall of the Reformation is devoted to the higher philosophy, and audiences of more than two thousand people often assemble there to hear discourses on the Origin of Evil, and similar topics. Even this does not exhaust the capacity of the Genevese for instruction, and there are sometimes five evening lectures, on subjects of equal interest, going on at the same moment in different parts of the town.

OUR author, while recognizing the exceptional position of Geneva, as the intellectual centre of Switzerland, and a point where people of many nations meet, nevertheless believes that, artistically, at least, its example might furnish an example to the French provincial towns. Ethnologically, there is no more difference between the Genevese and the French than there is between the Bretons and the Provençals, the Picards and the Gascons, or the Normans and Burgundians, and there is no reason, except in the habit of centralization, why Rouen, Dijon, Lyons, Amiens and Marseilles should not each become a centre of architectural development, if not of other sorts of cultivation. For this they would have an advantage which Geneva does not possess, in the existence of splendid local types of architecture, infinitely nobler and more interesting than the diluted Parisianism which now reigns in all French provincial towns. With such a foundation to build upon, and the instruction that a well-equipped architectural school could give, the inborn capacity which was able, seven hundred years ago, to produce the glories of Norman, Picard and Burgundian architecture, and the Romanesque of Central and Southern France, or which, later, showed itself in the Renaissance of Touraine, ought to win for the great provinces which compose the Republic a renewed artistic fame, as brilliant as that which rendered illustrious the emulation of the Free Cities of the Middle Ages. We need not say that, in our opinion, the future of art in general, and especially of architecture, in this country, depends in a great degree on the development of local schools, much like those which our author wishes to see revived in France, and on the emulation and differentiation which would come from the establishment of such schools. We should not wish to see, as our author suggests, public building in our towns restricted to local architects, but we are convinced that good architectural and artistic schools in all our large cities, devoting themselves, perhaps, with a certain care to the artistic use of local materials, and the treatment of local conditions, with suitable provision for comparing results with each other, are the foundation on which our artistic greatness must rest. It is true that we already have many of the schools, and we have now a certain provision for emulation between them; but the importance of differentiating the schools is hardly yet thought of. Among the architects themselves, something of the sort has been done, perhaps by instinct, as in the case of the Spanish fashion of building which we have learned to associate with California, and the rich Renaissance which is becoming characteristic of New York, but this process of differentiation by natural selection should be recognized in the schools, and intelligently guided by them, before it can produce the best results, and in this, as in many other matters relating to architectural education, the profession might interest itself to great advantage.

IT is interesting to learn that the Mohammedan population of Paris has increased so much of late that a committee has been appointed to consider the subject of building a mosque for their benefit. This committee includes Benjamin Constant, the painter, and two architects, MM. Ambroise Baudry and Saladin. Whether the last is related to the great champion of the Prophet, we cannot say, but why Benjamin Constant, or M. Baudry, should concern themselves with the affairs of Mohammedan worship we will not attempt to explain, nor is it, apparently quite certain that the Turks and Arabs of the city are desirous of having their affairs interfered with by these gentlemen. There is a certain class of people in Paris, to which, it is to be understood, we do not say that MM. Constant and Baudry belong, who patronize, so to speak, all sorts of outlandish sentiments and superstitions, in order to show that they are themselves free from any prejudices of that sort; but between having no religion, and professing the religion of the Prophet, there is a very long step, and the committee might find an interview, in their mosque, with a crowd of fanatic dervishes, on the subject of the furnishing of the sanctuary, an awkward affair.

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ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — XIII.

THE NATIONAL CODE OF RULES FOR ELECTRIC WIRING. — VI.

22. INTERIOR CONDUITS[2]: —

[The American Circular Loom Co. Tube, the *brass-sheathed* and the *iron-armored* tubes made by the Interior Conduit and Insulation Company, and the Vulca Tube are approved for the class of work called for in this rule.

NOTE. — The use of two *Standard* wires (see Rule 10 *a*), either separate or twin conductor, in a straight conduit installation is approved in the *iron-armored* conduit of the Interior Conduit and Insulation Company, but not in any of the other approved conduits. (See Rule 22 *e*.)]

a. Must be continuous from one junction-box to another, or to fixtures, and must be of material that will resist the fusion of the wire or wires they contain without igniting the conduit.

b. Must not be of such material or construction that the insulation of the conductor will ultimately be injured or destroyed by the elements of the composition.

c. Must be first installed as a complete conduit system, without conductors, strings or anything for the purpose of drawing in the conductors, and the conductors then to be pushed or fished in. The conductors must not be placed in position until all mechanical work on the building has been, as far as possible, completed.

d. Must not be so placed as to be subject to mechanical injury by saws, chisels or nails.

e. Must not be supplied with a twin conductor, or two separate conductors, in a single tube. [See Rule 22.]

f. *Must have all ends closed* with good adhesive material, either at junction-boxes or elsewhere, whether such ends are concealed or exposed. Joints must be made air-tight and moisture-proof.

g. Conduits must extend at least one inch beyond the finished surface of walls or ceilings until the mortar or other similar material be entirely dry, when the projection may be reduced to half an inch.

A *junction-box* (Fig. 56) is a box made of material similar to that composing the conduit with which it is used and it is placed where connections are to be made, as, for instance, where a tap wire joins a branch wire or where a branch wire joins a main wire. In these boxes the tubes making up the conduit system end, and from these points all wires are inserted or withdrawn. The use of the junction-box makes easy the connection of the wires, it brings these connections to an accessible place and it provides a place for the fuse-blocks. The boxes also make it unnecessary to have concealed joints in the wires and make it possible always to remove lengths of wire that may become defective or that will be too small for an increased number of lights.

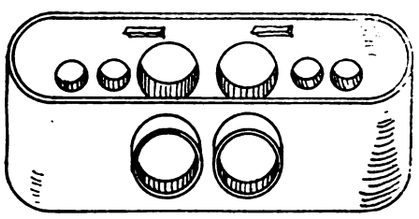


Fig. 56. One form of Junction-box: shown without cover.

Since conduit is allowed in all sorts of places, it of course should not be of such material that it would burn upon the fusing of the wire. If the wire be properly protected by fuses, it can never overheat sufficiently to fuse, but the safety of the construction obviously should not depend upon the carefulness of the men who place the fuses.

As the conduit is not depended upon for insulation it is doubly important that there be nothing in its composition that will injure the insulation on the wire.

The virtues of the conduit consists in its being a complete protection to the insulation on the wires entirely enclosing it at all points, and affording a smooth and ample raceway for the insertion and extraction of the wires. If conduits were allowed to be installed with the wires inside, there would not be the same necessity to the workman of joining the tubes accurately that there is when the wires must be afterward inserted, and many installations would through carelessness be little better than plain installations of fished wire, with lengths of tube strung along the wire as suited the convenience of the workman. Even if it were allowable to lay strings in the tubes at the time they were placed, so that the wires might be pulled in by means of the strings afterward, there would be danger of abrading the insulation on the wire, because it would then be possible on account of the force that could be applied, to pull wires through tubes that were too small, or in which there were obstructions that would tear the insulation. There would be lost too, all advantage that comes from being able to remove and replace wires with facility. By requiring the conduit to be first installed as a complete system and the wire to be then pushed in, there is assurance that the joints in the tube are well made — or otherwise the wire would catch — and that there are no nails driven through the tube anywhere or obstructions in it, for in that case the wire could not be forced through.

If conduits be inserted before the mechanical work on the building is completed, any damage to the installation through crushing, cuts, or punctures not only injures the tubing as a mechanical protection, but it is apt to injure the insulation on the wire at the same place. If the wire be inserted after the work on the building is completed, these damages are likely to be discovered when an attempt is made to insert the wire, and even though the wire slip through easily and the defect in the tubing be not discovered, there is at least the surety that the electrical insulation on the wire is intact.

If a tube containing a twin wire (Fig. 55) or two separate wires were pierced by a nail and a short-circuit thus caused, or if from any other reason an arc were to form in the conduit, there would be danger of the conduit igniting before the protecting fuse could melt. With the iron-armored conduit there is very little liability of such short-circuits forming because the iron armor is a thick iron pipe like a gas-pipe, which is an effectual protection against nails. Even though an arc form within the conduit, harm could hardly be done, since the fuse protecting the circuit would melt before the iron would burn through.

Rule 22 (*f*) is made because it is wished to have the conduit as free from moisture as possible, and by having the ends closed and the joints air-tight there is less liability of the gathering of condensed moisture.

23. DOUBLE-POLE SAFETY CUT-OUTS: —

a. Must be in plain sight or enclosed in an *approved* box, readily accessible.

[Section *a*. To be *approved*, boxes must be constructed, and cut-outs arranged, whether in a box or not, so as to obviate any danger of the melted fuse metal coming in contact with any substance which might be ignited thereby.]

b. Must be placed at every point where a change is made in the size of the wire (unless the cut-out in the larger wire will protect the smaller).

c. Must be supported on bases of non-combustible, insulating, moisture-proof material.

d. Must be supplied with a plug (or other device for enclosing the fusible strip or wire) made of non-combustible and moisture-proof material, and so constructed that an arc cannot be maintained across its terminals by the fusing of the metal.

e. Must be so placed that on any combination fixture no group of lamps requiring a current of six ampères or more shall be ultimately dependent upon one cut-out. Special permission may be given *in writing* by the Inspector for departure from this rule in case of large chandeliers.

f. All cut-out blocks must be stamped with their *maximum* safe-carrying capacity in ampères.

It is required that cut-outs or fuse-blocks be in plain sight, because when the fuse melts there is an arc for at least a short time and it is obviously dangerous to have this take place in a concealed place where there possibly may be inflammable material. Where there are several cut-outs grouped, it is more convenient to have them enclosed in a box built flush with the wall. The best boxes are made entirely of non-combustible material, but they are usually made of wood, lined throughout with asbestos board (Fig. 57).

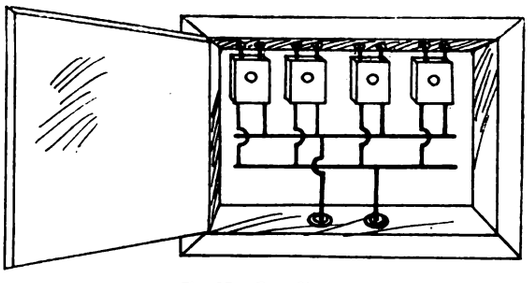


Fig. 57. Fuse Closet.

Where branches lead off from main wires care must be taken that fuses be provided to protect them. Thus, in Figure 58, suppose a branch to be taken off at *A*. On the wires *BB* is a motor and on the wires *AA* are 5 lamps. Suppose the motor to require 25 ampères. Then the fuses at *C* must have a carrying-capacity of at least 25 ampères or they will melt when the motor operates. But suppose the wires *AA* to be No. 14 B. & S. gauge, which is large enough to carry the current required for the 5 lamps which it supplies, but which would overheat, in case there were a short-circuit, before the fuses at *C* could melt. It is consequently necessary to have smaller fuses at *A* where the size of wire changes, so that the carrying-capacity of these No. 14 wires will not be exceeded. If there were no motor or lamps on the wires *BB* then there would be no need of fuses at the point *A*, because a small fuse that would protect the wires *AA* could be put in the cut-out at *C*.

The bases of cut-outs must be non-combustible, because otherwise they are liable to ignite from the heat of the arc that forms when a

[1] Continued from No. 1020, page 15.

[2] The object of a tube or conduit is to facilitate the insertion or extraction of the conductors to protect them from mechanical injury, and, so far as possible, from moisture. Tubes or conduits are to be considered merely as raceways, and are not to be relied on for insulation between wire and wire, or between the wire and the ground.

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fuse melts; they must be of insulating material, because otherwise there would be constant leakage; they must be water-proof for dampness will cause leakage.

When fuses melt the arc sometimes melts off particles of the copper or brass to which the fuse is attached, and if this molten metal flies

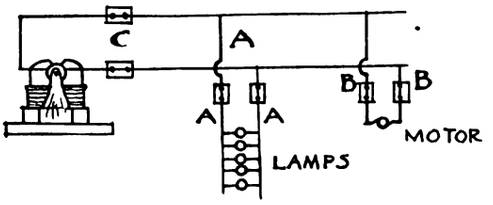


Fig. 58. Illustrating Use of Branch Fuse.

into inflammable material that may be ignited. For this reason it is required that the fusible metal be entirely enclosed by non-combustible material, as it would be, for instance, in a cut-out like that shown in Figure 22 where there is a porcelain cover. Figures 59 and 60 give two views of a "plug." The fusible metal is soldered to brass terminals set in glass, and a brass cap screws over the top, while the whole plug screws into the cut-out base.

If a fuse be too short, the arc formed by the melting of the fuse will continue between the terminals to which the fuse is attached, and will give out intense heat just as an arc-lamp does. It is consequently of great importance that the length of fuse be enough to insure an arc of short duration. The electrical pressure and the current at the time the fuse melts, both determine the distance the arc can hold over, but as there is always a liability and even a probability that the fuse will melt because of a short-circuit, and consequently from a very heavy current, the correct length of fuse must not be judged by the smallest current that will fuse it. The length of fuse metal for 50 volts should not be less than $\frac{3}{4}$ inch, the length for 110 volts not less than 1 inch, for 220 volts not less than $1\frac{1}{2}$ inches and for 500 volts not less than $4\frac{1}{2}$ inches.

A *combination fixture* is one that is arranged so that either gas or electrical lights may be used. If a large number of lamps were dependent upon one fuse, or rather, if one lamp were dependent

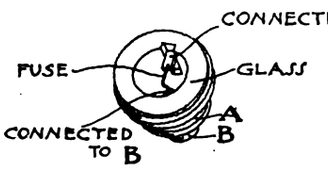


Fig. 59.

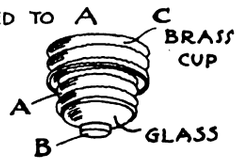


Fig. 60.

upon a fuse large enough to carry the current for many lamps, then a short-circuit in one of the lamps or in its receptacle might cause a vicious arc that would burn through the gas-pipe and do considerable damage before the fuse could melt. Even though there be no wire in circuit small enough to require a five-ampère fuse, lamps on combination fixtures should nevertheless be arranged so that no lamp will be dependent upon a fuse larger than this.

Cut-outs should be stamped with their maximum-carrying capacity so there will be no excuse for overloading them.

24. Safety Fuses:—

a. Must all be stamped or otherwise marked with the number of ampères they will carry indefinitely without melting.

b. Must have fusible wires or strips (where the plug or equivalent device is not used), with contact surfaces or tips of harder metal, soldered or otherwise, having perfect electrical connection with the fusible part of the strip.

c. Must all be so proportioned to the conductors they are intended to protect that they will melt before the maximum safe-carrying capacity of the wire is exceeded.

The largest number of ampères that a fuse will carry for an indefinite time without melting is its carrying-capacity. It is better to mark the fuse with its carrying-capacity than with its fusing-point, because the amount of current that the conductors are to carry is determined by their size and it is only necessary to choose a fuse with the same carrying-capacity, while if the fuse were marked with its fusing-point a careless or ignorant person might allow altogether too much margin in choosing the size of fuse for a given case. It is important that the fuse itself be marked, not only so that one will know definitely what is used, but because when the fuse melts it is then known what size is required to replace it.

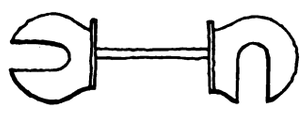


Fig. 61. Fuse with Tips of hard-metal Fuse-link or Safety-catch.

Figure 61 shows a fuse having tips of copper soldered to the fuse wire. These are also called "fuse links" or "safety catches." Fuse metal being soft and inelastic cannot be properly fastened under the head of the binding screws in the cut-out. It is apt gradually to work loose, thus making a poor contact that is a frequent cause of overheating in the cut-out. The copper tips furnish a true, hard and elastic terminal that can be securely clamped. Moreover these fuse links with tips of harder metal are more accurate as regards their fusing-point than fuse wire alone. A fuse wire of a given diameter will have different fusing-points for different lengths of fuse; for when the fuse is very short the metal to which it is attached conducts the heat away from the fuse so fast that it takes a large current to generate heat fast enough to melt it. When the fuse is long, the heat is not taken away from the fuse metal so fast and a smaller current will melt it. With fuse links, however, the length of fuse metal is fixed because it is soldered to the copper terminals, and the manufacturer is careful to choose a size that will have the proper fusing-point. Figure 62 illustrates this change in fusing-point with the change in length of fuse. With the size fuse wire for which this curve is true, it will be noticed that when the fuse is five inches or longer, the fusing-point is very close to 24 ampères, while when the fuse is 1 inch long, for instance, the fusing-point is 45 ampères.

If the fuse is to protect the wire, it is obvious that it must melt before the carrying-capacity of the wire is exceeded. It is, of course, not possible for the fuse to heat to the melting-point instantly when

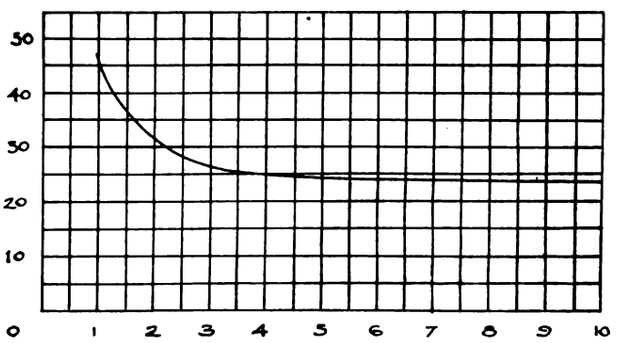


Fig. 62. Showing different Fusing Points for different Lengths of the same Wire.

an excessive current flows, but as the wire cannot instantly heat to a dangerous temperature either, the fuse properly porportioned is a good protection against this particular kind of danger.

25. Table of Capacity of Wires:—

It must be clearly understood that the size of the fuse depends upon the size of the smallest conductor it protects, and not upon the amount of current to be used on the circuit. Below is a table showing the safe-carrying capacity of conductors of different sizes in Brown & Sharpe gauge, which must be followed in the placing of interior conductors:—

	Table A. Concealed Work.	Table B. Open Work.
B. & S. G.	Ampères.	Ampères.
0000	218	312
000	181	262
00	150	220
0	125	185
1	105	156
2	88	131
3	75	110
4	63	92
5	53	77
6	45	65
8	33	46
10	25	32
12	17	23
14	12	16
16	6	8
18	3	5

Note. — By "open work" is meant construction which admits of all parts of the surface of the insulating covering of the wire being surrounded by *free* air. The carrying-capacity of 16 and 18 wire is given, but no wire smaller than 14 is to be used except as allowed under Rules 18 (*a*) and 27 (*d*).

The size of wire is determined by the amount of current it has to carry and the fuse is determined by the size of wire. If the fuse be always chosen with regard to the size of wire only, the wire cannot be dangerously small and still be used, because when a current above its carrying-capacity is sent through it, the fuse will melt.

26. Switches: —

a. Must be mounted on moisture-proof and non-combustible bases, such as slate or porcelain.

b. Must be double-pole when the circuits which they control supply more than six 16 candle-power lamps, or their equivalent.

c. Must have a firm and secure contact; must make and break readily, and not stop when motion has once been imparted by the handle.

d. Must have carrying-capacity sufficient to prevent heating.

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e. Must be placed in dry, accessible places, and be grouped as far as possible, being mounted — when practicable — upon slate or equally non-combustible back boards. Jack-knife switches, whether provided with friction or spring stops, must be so placed that gravity will tend to open rather than close the switch.

If switches are not mounted on water-proof and non-combustible bases, arcing, and heating arising from leakage will be apt to set the base on fire.

A single-pole switch draws a longer arc than a double-pole switch, because the single-pole switch breaks the circuit in only half as many places, and moreover, since it is on only one side of the circuit, it does not break all connection with the wire beyond the switch. For these reasons the single-pole switch is thought suitable only for small tap circuits and its use is limited to branches having on them not more than six 16 candle-power lamps. The making of a connection that completes a circuit and the breaking of a connection that interrupts a circuit are spoken of as the "make and break."

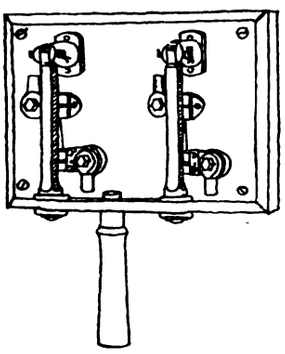


Fig. 63. Jack-knife Switch.

Rule 26 (*c*) is made to provide against the arcing in the switch that would be caused by poor construction.

If the parts of a switch that conduct the current are too small or if the surfaces that come together do not make sufficient connection, the switch will heat just as a wire that is too small will heat. Resistance is introduced and wherever current is forced through resistance there is heat.

The *jack-knife switch* is shown in Figure 63. It will be seen that if the switch be mounted so that it is closed by moving the handle down, anything accidentally falling on it, or possibly a jarring of the supports will close it and perhaps in doing so cause a short-circuit somewhere, as at a motor, for instance. Stops of some kind, either springs or friction arrangements, are usually provided, but they are not always trustworthy and it is just as easy and as convenient to mount the switch so that it tends to fall open rather than shut.

RUSSELL ROBB.

[To be continued.]

BERLIN TENEMENT-HOUSES.

THE act of the New York Legislature appointing a committee to examine into the tenement-house question in the City of New York, and "to report thereupon to the next Legislature," became a law on May 4, 1894. Under this law, the following were named as the Tenement-house Committee by the governor of the State: Cyrus Edson, Roger Foster, Richard Watson Gilder, Solomon Moses, George B. Post, John P. Schuchman and W. D'H. Washington.

At the request of this committee, the Department of the State sent the following instructions to its consular representatives in Berlin, Brussels, Glasgow, Liverpool, London and Paris:

(1) What laws or municipal ordinances regulating the construction and use of tenement-houses, dwellings for artisans, houses in which three or more families reside, are in force in the city where your office is situated?

(2) What has been the practical effect as regards morals, crimes, health, and otherwise, of the operation of such laws?

(3) In this connection, please state whether there has been any change in the death rate, number of illegitimate children, and of crimes committed in the district?

(4) Have any tenement-houses, artisans' dwellings, or dwellings containing three or more families been constructed in your city, or in its vicinity, by the national or city government, or by any philanthropic societies or individuals?

(5) If so, please describe them and state what has been the practical effect as regards morals, crimes, health and otherwise, of this construction and use — as recited in question 3.

(6) Has any investigation into the condition of the dwellings of the poor been recently made in that locality? If so, please send a copy or abstract from the report containing a full copy of any recommendations therein made.

As the reports, in answer to the foregoing interrogatories, were received at the Department, they were immediately mailed to the New York committee, in order to avoid the delay of copying them, the law being mandatory in regard to the time at which the report of the committee should be submitted to the Legislature. A printed copy of the committee's report shows that it was submitted on January 17, 1895.

The following are the reports as received from the consular officers. A number of plans, illustrations, books, etc., accompanying them were not deemed necessary to publish, and have been filed in the Department for reference.

BERLIN.

On my arrival at this post, I found that a request for information had been transmitted by the Department of State some month ago, at the request of a Legislative committee of the State of New York concerning the conditions of tenement-houses in Berlin. The unsettled condition of affairs of this consulate-general prevented an earlier reply.

The six interrogatories submitted in the circular from the Department are not as susceptible of clear, well-authenticated answers as one could wish; in part, because no statistics of very recent date can be reached, and, in part, because of the difficulty of obtaining data from those who might be supposed to know.

On the authority of Herr Oberbürgermeister Zelle I answer the series of questions as follows:

(1) No laws or municipal regulations exist regulating the construction and use of tenement-houses in Berlin.

(2) The practical effect of such laws is nil.

(3) Changes in death rate, illegitimate children born, and crimes committed can not be given because there is no separation of statistics in regard to tenement-houses.

(4) Neither national nor city government has constructed tenement-houses, artisans' dwellings, or dwellings for three or more families. Individuals and societies have.

(5) No statistics are to be had as to such new buildings. Morality and mortality figures are not separated for such structures, nor are there any distinctive "tenement-house districts" in Berlin.

(6) The *Oberbürgmeister* knows of no investigation into the condition of the poor having been recently made in Berlin.

Berlin has done much to improve the condition of the laboring classes as regards their housing; but rents have risen and wages have fallen; capital has embarked on the building of fine new quarters of the city and neglected the tenements, thus failing to provide small buildings, apartments and small suites and, in many cases, driving the poor still closer together into such buildings as existed before.

The moving of factories that employ many hands toward suburbs which are not inhabited by the rich, and the rise of rents in the city proper, have forced the poorer classes toward the outskirts. Efforts have been made to provide laborers with small separate houses still farther out, but this is not practicable on any large scale for the really poor. They must live near their work, near the city centres where wives and children find customers, patrons, etc., and thus help; near the swarms of homeless men and women who hire sleeping spots by the night or week; near, in fine, the conveniences of a big town, heating, water, gas, etc. Hence it is recognized by the best authorities that the "rent barracks" or *Miethskasernen*, are necessary evils. Laborers, at present, must live close together in order to live on their present wages.

During the years 1886–1890, the number of lodgings attainable by the working class and small official class showed a steady decrease.

Rentals.	Decrease.	
	From—	To—
1 mark to 50 marks (23.8 cents to $11.90)	773	532
51 to 100 marks ($12.14 to $23.80)	12,379	7,511
101 to 150 marks ($24.04 to $35.70)	31,80[illegible]	23,016
151 to 200 marks ($35.94 to $47.60)	52,320	45,520

But the average rental for all lodgings in Berlin rose during this period from 609 marks to 666 marks ($144.94 to $158.51). This came from the rise in the higher-priced flats and lodgings, namely, those for which more than 200 marks ($47.60) were paid. While wages and salaries fell, these rentals rose in number from 322,175 to 402,610.

In 1890, the population of Berlin was estimated at 1,436,233, of whom 265,101 paid no taxes. The taxes paid by the remainder were proportioned as follows: Persons paying income tax, 120,412; class tax, by families, under 900 marks ($214.20) limit, 622,550; class tax, by families, over 900 marks limit, 428,170. Reduced to heads of families, 318,755 persons paid taxes under the 900-mark limit and 162,540 persons over the 900-mark limit.

The large proportion of families for whom cheap lodgings are absolutely necessary may be seen from the number of families taxed under the 900 mark limit.

But prices of the simplest lodgings bear no relation to average wages and salaries. An average laborer or small official, with wife and child, should have from 1,575 to 1,750 marks ($376 85 to $416.50) annual income to occupy the smallest quarters, reckoning his rent at one-fifth his income.

The average daily wage of an adult man is only 2.40 marks (57 cents), which at three hundred working days — a very favorable conjunction — gives but 720 marks ($171.36) annually.

Now, the rent of one room and kitchen in the back part of the house, where air is poor and often foul, is reckoned at an average of from 230 to 270 marks ($54.74 to $64.26); rent of a room with two windows or one-windowed room and kitchen, 315 to 350 marks ($74.97 to $83.30); rent of an apartment with a two-windowed front room, one-windowed back room, corridor and kitchen, averages 450 marks ($107.10). A workman, with wife and child, must, therefore, spend about 315 to 350 marks ($74.97 to $83.80)

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annually on his rent alone, or nearly one-half what he makes as an average wage-earner. Hence, it is necessary that wife and children must work to help pay the family's way, and any small floor, bed, or sofa space that can be squeezed out is let to more or less permanent tenants for the night. These sub-lodgers are called *Schlafburschen* — sleep-boys or sleep-lodgers. They are of both sexes and all ages; they comprise the hard-working, sober young laborers, steady girls, widows and widowers, as well as the floating population which deals in and distributes vice, infectious diseases and punishable crimes.

Efforts have been made to stop this subletting, and the Berlin police, which does not make its hand light, adds much to the misery of the laboring classes by its endeavors to interfere with and regulate such abuses. Sleeping out and strolling in streets and parks are offences against the civic rules; "sleeping in" can not be so well attacked for obvious reasons. "Sleep-lodgers" harm the family union by introducing jealousies between the married people, spoil family privacy, and often corrupt the young. Illegitimate children born to very young girls are the natural result of promiscuous herding together of the sexes.

The tenement-house in Berlin is not so easily recognized as in some other cities, owing to the admirable cleansing and police systems; also to the fronts on the street, often imposing, which cover much misery. A common thing is a broad, high, massive front broken by an arched passage, which leads to one, two, or three courts. The back courts are often ill-kept, narrow and foul, violating the rules which prescribe so many cubic feet of air to the human being. They are often old buildings, by no means calculated for the human strain to which they are now subjected, and lack conveniences, especially closets. In these houses the worst mortality occurs in garrets; then come the cellars. Garrets are more fatal, perhaps, because of the greater cold or the strain on the old and sickly from having to ascend and descend stairs, or it may be that garrets are slightly cheaper than cellars, which latter are largely rented by dealers in old rags and iron, etc., so that the poorest of the poor people, already weakened by disease and hunger, take to the garrets and are predisposed to greater mortality. Cellars are also occupied by men and women who take charge of the cleaning of the houses. Even in the best houses, the gate-keepers or *portiers* live in very badly lighted, badly warmed, and ill-ventilated rooms considerably below the level of the street. In the back parts of tenement-houses, these evils are much worse. In 1880, as many as 100,000 people lived in cellars. In that year attention was drawn to the excessive crowding of the floating population in large single rooms, locally called *Pennen*, which offered places for the beginning of epidemics. The worst of these were done away with then, but there is a constant tendency to their revival in defiance of the police.

Cellar-dwellers suffer from eye diseases and rheumatism, owing to the lack of light and the dampness of the walls. As lately as 1893, the number of cellar-dwellers was reckoned at 100,000, which is a diminution, in view of the general increase of population, but shows badly still. There is no reason to estimate them at a smaller figure now. They exist in the suburbs, where rents are relatively cheaper, as well as in older quarters. Big houses in the suburbs often have horse and cow stables in the back; the effluvia and drainage from these stables affect the cellars especially.

Under such conditions, the misery of renters of cheap lodgings is enhanced by the fear of landlords that the rents will not be paid. The German laws as to detaining furniture for rent are still unfavorable to the poor, and the latter, therefore, hesitate to buy decent furniture. On the other hand, the landlord is slow to repair tenements, knowing that his rooms will get hard usage and that he can not expect long tenures, while the pressure of demand for any sort of rooms is so great that he need not fear they will be long vacant. Rents are still taxed in Berlin.

Fine apartments in Berlin are a drug on the market, owing to the boom in such property since 1880. Much capital has been lost in that way. The financial and commercial stringency of 1893 and 1894 has done much harm; but the accommodations for the poor have not improved, nor has there been any fall in rents for high-priced apartments (flats) in good neighborhoods.

Property-owners in Berlin are heavily taxed, and are much worried by police regulations. They find it safer to take the chances of renting to the well-to-do for long periods than to enter the laborious career of tenement owning. Hence, while Berlin is overbuilt for rich people and those with moderate fixed incomes, it is underbuilt for the laboring classes.

The rise in rents in general may be seen from an estimate made this month in the *Vossische Zeitung*, which is based on figures for 1893: From 1869 to 1893, 63.6 per cent was raised somewhat, and 30.2 per cent was raised to double or triple; From 1851 to 1893 7.9 per cent was raised somewhat, 32.3 per cent raised to double or triple and 57.4 per cent raised to triple or quadruple. The average of all rents rose from 295 marks ($70.21) in 1851, to 391 marks ($91.57) in 1861, and from 407 marks ($96.87) in 1864, to 671 marks ($159.70) in 1893. As to empty dwellings (houses, flats and lodgings), there were 9,925 unoccupied in 1884, and 6,904 in 1887; but since 1887, they have increased annually at about 5,000, so that, in 1893, there were 26,262 unoccupied, representing the value of 11,000,000 marks ($2,618,000).

In 1893, fully 6 per cent of Berlin dwellings stood empty, and this year the number must be greater. During 1861–1885, while the size of building lots grew gradually smaller, the proportion of people to the lot grew larger in the following ratio: In 1861, 48.3 per cent; 1864, 49.7 per cent; 1867, 51.4 per cent; 1871, 57 per cent; 1875, 58 per cent; 1880, 60.7 per cent; 1885, 66 per cent.

The "sleep-lodgers," or floating population of Berlin, increased through factory demands and the depressed condition of many agricultural lines, which forced laborers to the capital, while a growing dislike to the monotony of country life has steadily augmented their numbers during the last decade. In some parts of the city they doubled between 1880 and 1890, during which period they rose from 5.42 per cent of the population to 6.21 per cent. In the northern quarter, called Moabit, at the section called "Wedding," they rose from 2,157 to 5,817. In the Upper Friedrichstadt of the Schöneberg quarter, the rise was from 1,923 to 4,238, and in the Lower Friedrichstadt, from 3,687 to 8,437. In 1880, the "floaters" were 92,189; in 1885, 124,626; and in 1890, 133,359. Only two districts showed a decrease.

I will add a translation from the work by Liszt and Lilienthal on the criminal world of Berlin, dated 1885, which Dr. Heinrich Albrecht characterized in 1891 as still true in many parts of the city.

> When you enter such a building you are at once met by a pestilential smell of moist rottenness. Filth rules everywhere, and half-naked children pummel each other on the stairs. Discord and war reign between the neighbors on the same floor. On the slightest pretext, wordy battles occur on the stairs and floors, accompanied by the most filthy expressions and bloody scrimmages. Sticks, broomsticks and knives play a large part. The women scatter loathsome liquids and filth on each other, men throw each other down stairs, and, in between, children of every age whine and cry. On every occasion of the kind two parties form themselves in the house, and these make war on each other. They only unite when it occurs to the owner or his representative to be so foolish as to attempt to interfere in order to obtain peace. Then they fall in one band upon him and beat the common hated enemy black and blue.
>
> Just the same thick, foul-smelling air, the same filth as are found in the entry and on the stairs occur inside the apartments. Everything lies about "higgledy-piggledy." What few beds and furniture exist are old and rickety. If the apartment consists of several rooms and a kitchen, the rooms are generally rented out to young people, some of whom work, others not, or to prostitutes, often women of the most dangerous variety; the family arranges itself in the kitchen. But if the apartment consists of only one room, which, of course, must serve at one and the same time as sitting-room, sleeping-room and kitchen, then everybody is crowded together in one spot. In the single bed, which has generally been made up only once for all, lie husband, wife and children, just as they happen to get a place; often there are children on the floor in the straw, and among them the "sleep-lodger."

Under these conditions, it is not surprising that the men and boys in families of small officials, burghers, shopmen and laborers desert their homes for the beer-shop or restaurant, which are the clubs of Berlin, while the young women take to dance-halls, with the usual results of danger to morals.

Charles de Kay, *Consul-General.*

Berlin, November 12, 1894.

A SYLLABUS OF EARLY CHRISTIAN, ROMANESQUE AND GOTHIC ARCHITECTURE. — I.

INTRODUCTORY.

EARLY Christian architecture is of special importance as the beginning and nucleus of a new style.

The chief building of the early Christian time, the *basilica*, the building of worship for the new faith, becomes the model upon which later ages enlarge.

Methods of vaulting practised by the Romans develop under the influence of the Christian spirit into new and interesting forms in the Byzantine style.

The combination of vaulting with the plan of the basilica produces Romanesque, and in due time Gothic style.

SOME GENERAL POINTS.

The classification of historical buildings into groups is based upon their general characteristics.

For the recognition of these a study of the building in reality, or in geometrical outline on paper is necessary. The latter is, for convenience, drawn in two forms: first the *ground-plan* and second the *elevation*.

The former shows the foundation, and thereby the main outline as regards the extension and general disposition of the building. The latter conveys the impression of the structure as a whole, exterior and interior, the arrangement of the lower parts as well as the upper ones, and is usually divided into sections.

The ground-plan thus gives the fundamental thought as to the disposition of the space, while the elevation shows the plan carried out.

Architecture consists further of two parts: one mechanical, named *construction*, essential to the erection of the building; and another of *æsthetical* character, essential to its pleasing qualities as regards decoration and artistic effect.

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In architecture, æsthetical pleasure is closely connected with constructive excellence, and our enjoyment, strictly speaking, depends as much upon one as upon the other.

In the study of construction, then, the ground-plan as the abstract idea is the point from which we start, but in course of study we advance to the elevation, which allows a consideration of the structure as well in detail as a whole.

For an æsthetic valuing of the edifice, ground-plan and elevation are alike important. The latter, however, as a means of recognizing the artistic perfection of the building, appeals more fully to the understanding.

HISTORICAL POINTS.

The vast extension of the Roman sway.

The Roman soldier was a promoter of civilization as well.

The centralization of this sway was in the omnipotent person of the emperor and his residence, the city of Rome. Whatever changes affected these were experienced throughout the State.

The decaying Paganism. The Christians tolerated as a Jewish sect. Their disobedience to Roman laws causes hostility on the part of the government. Ten persecutions. The martyrs.

The Christian religion recognized by the State on the accession of Constantine, 323 A. D.

Early Christian architecture includes three kinds of structures:

A. The catacombs — peculiar excavations in the earth, but of no influence upon succeeding architecture.

B. Concentric buildings, which continue a form much appreciated in pagan art.

C. The basilicas, destined to become the Christian churches proper, especially in the Occident.

THE CATACOMBS. — ORIGIN OF THE CATACOMBS.

The Roman mode of burial by preservation of the ashes of the deceased.

The Christians decline to burn their dead.

The construction of the catacombs. Crypts for memorial services. Place of refuge in time of persecution. The sanitary conditions, however, prevented the gathering of any large congregation in these subterranean chapels.

The catacombs forgotten and lost track of. Recent discoveries. The great historical interest of the inscriptions and paintings found there.

According to the system of basing the classification of historical monuments chiefly upon their ground-plan, early Christian buildings are divided into:

A. Buildings with concentric ground-plan.

B. Basilicas (rectangular ground-plan).

This mode of division also marks the main distribution of monuments thus:

a. Concentric buildings in the Orient.

b. Basilicas in the Occident.

Exceptions are chiefly:

1. Rome and Ravenna in the Occident, containing concentric edifices.

2. Syria in the Orient possessing a number of remarkable basilicas.

A. CIRCULAR AND POLYGONAL STRUCTURES. — INTRODUCTORY.

Christianity is not inventive. It distinguishes itself mainly by the adoption of forms already existing.

The Romans renowned masters in vaulting. Their unsurpassed talent for management of space as regards its constructive and decorative character so as to create an harmonious impression. This interest for a vast and well-defined space intimately connected with the erection of the cupola. Examples:

Pantheon, Temple of Minerva Medica.

Christianity enters into the inheritance, but disfigures the circular or polygonal building, for the sake of the cult, by the addition of a separate apse.

The difference between Occident and Orient during this period consists mainly in the devotion of the Orient to the concentric structure.

In these buildings the construction and the æsthetic ideas are one.

HISTORICAL POINTS.

The origin of the concentric building may be ascribed to the pagan custom of erecting tombs in the shape of a tower:

Mausoleum of Cæcilia Metella in Rome.

The circular, or polygonal shape is furthermore used in some cases for temples:

Temple of Vesta, Pantheon, Temple of Jupiter at Spalato.

And finally, as large additional hall in the imperial palaces or thermæ (*frigidarium*).

The Christian idea, likewise, of the concentric structure, as a tomb, is perhaps the reason for the circular shape of most baptisteries (the "grave of the former existence"), the baptismal tank or piscina forming the architectural centre.

Further, many sepulchral and memorial churches are of a concentric character, the tomb of the saint or memorable dead being placed in the middle of the edifice.

In Byzantine style the concentric form is adopted also for parochial churches.

MAIN CHARACTERISTIC OF CONCENTRIC PLAN.

Material employed in the construction is mostly brick.

The *concentric building* has a pronounced direction of growth in height and in circumference.

All these structures, whether circular or polygonal, have a common centre around which the parts group themselves enrythmically. Hence, generally styled concentric. The absolute symmetrical character of all parts is ideal.

The chief feature of the building, namely, the cupola, enforces this impression of concentricity by its dominating elevation.

The *ground-plan* varies according to the form adopted, whether circular, polygonal, Greek cross or square; the radiation of subordinate parts being always from the centre. The building generally consists of an inner rotunda or polygon with surrounding aisle.

Elevation. — The use of vaulting, or of the cupola or dome as roof of the inner rotunda or polygon may be considered a general characteristic. Different kinds of vaults are: tunnel-vault, groin-vault (intersecting tunnel-vaults), cupola or dome being circular or polygonal, niche.

Concentric buildings without cupola are:

S. Stefano, Lateran Baptistery at Rome.

The inner, or main structure usually rises two stories or more. Frequent use of niches or colonnades in the interior, which serve as supports as well as divisions between inner and outer aisle.

As immediate supports of the cupola, besides the drum proper, are used piers (in the corners of the polygonal substructure that also form outside buttresses) and pendentives.

The predominance of the cupola is distinctly perceptible within, also, where it increases the loftiness and dignity of the room.

The distribution of light is of great importance, windows being either in the walls of the drum or piercing the lower edge of the cupola:

Sta. Sophia, in Constantinople.

The surrounding aisle is of great internal effect as contrast to the lofty central space. The irregularity and disfiguration of the plan is sometimes hidden by an enclosure (square or rectangular) which is not an advantage as regards appearance (Byzantine churches).

A portico is sometimes added as a pendant to the apse:

S. Vitale, in Ravenna.

MONUMENTS.

The simple rotunda or polygon uninteresting.

1. *The rotunda or polygon elaborated by niches.*

a. The niches remaining in the thickness of the wall:

S. Giovanni in Fonte at Ravenna, 430 A. D.
Tomb of Theodoric, sixth century.
S. Georg at Salonichi, sixth century.

b. The niches an extension of the plan and opening into the surrounding aisle or outside room:

S. Vitale at Ravenna, 526-547.
Church of Sergius and Bacchus at Constantinople, 527.

2. *Combination of polygon (or rotunda) with interior colonnade (or piers):*

Church of Holy Sepulchre at Jerusalem, 326.
Sta. Constanza in Rome, fourth century.
Lateran Baptistery, 432-440.
S. Stefano, fifth century.
Dome at Brescia, seventh century.

3. *The Greek Cross:*

San Lorenzo at Milan, fourth century (?)
Dome at Trier, 370 A. D.
S. Nazareo e Celso at Ravenna, fifth century.

4. *Structures of peculiar type:*

Sta. Sophia at Constantinople, 558-563.
Ch. of Sta. Irene at Constantinople, eighth century.
Ch. of S. Nicolaus at Myra (Asia Minor), tenth century.

B. THE BASILICAS. — INTRODUCTORY.

The origin of the basilica is a still-disputed point. The meaning of the term is probably "hall" in its widest sense.

The name for the Christian basilica is probably adopted from the Roman *basilica forensis* as a place where people congregated. Perhaps also the ancient custom of planning the common court-hall may have been of influence upon the method of dividing the Christian basilica into a middle room of great width, with aisles on either side supported by colonnades.

The immediate model, however, of the Early Christian church is most likely the *private house* which, of course, is the same, whether it be inhabited by pagans or Christians.

In the atrium of the Roman house with its adjoining *vestibulum*, *alæ* and *tablinum*, we have the ground-plan of the Christian basilica indicated.

The further development of this simple scheme is brought about by the purchase of the house as common property

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enlarged and improved upon by suitable changes: *e. g.* adoption of the plan of the *basilica forensis*.

The large dimensions, the galleries above the aisles, the semicircular form of the apse are either imitations or natural transformation of the original scheme.

MAIN CHARACTERISTIC OF THE BASILICAL PLAN.

The basilica may generally be described as a structure of rectangular shape and elongated proportions. The length of the building by far exceeds the height and width, and the horizontal lines are the predominant ones.

Of the whole structure, the place for the altar, the apse, is naturally the chief place of interest towards which all things tend and where the highest architectural and æsthetic achievement is to be sought. It is preceded by a vast amount of space that serves only as a preparation and introduction to the holy of holies. Inasmuch, however, as the apse forms only a small part of the entire complex, situated as it is at the farthest end of the building at considerable distance from the entrance, with a long and lofty main house or a spacious transept in front of it, the point of architectural gravity must be said to be thrown entirely upon one side of the edifice and the Christian basilica thus deemed eminently unsymmetrical in its disposition of space.

Material. — Brick substructure with wooden ceiling, either paneled or with visible trusses.

The *ground-plan* is generally characterized by an uneven number of parallel aisles separated by colonnades. The *middle aisle exceeds* the others in width and is clearly to be considered of chief importance. It terminates in a semicircular apse which is sometimes, especially in larger structures, preceded by a *transept*. This transept is without aisles.

The arms of the transept usually project beyond the line of the main body of the church thus forming the beginning of the cross, the so-called *Signum Tau*.

The basilica is in older structures preceded by a square *front-yard* or *atrium*, in later by a *pronaos* or *vestibule*.

Elevation. — The predominance of the middle nave creates in the interior an open and lofty room with light from the windows in the upper part of the walls, while from outside it is the main indication of the body of the church. Compared with the nave, the aisles appear low and very subordinate. The transept is of equal height with the nave. The latter has a gable front.

The apse is a semicircular niche and the only vaulted part of the structure.

The need of an open space between the aisles causes the walls of the nave to be supported by columns connected either by arches or an architrave, while the transept has only walls. The lack of suitable material sometimes suggests the use of piers instead of columns.

In the Orient the aisles have two stories, the gallery being reserved for women.

DESCRIPTIVE NOTES.

In accordance with ecclesiastical usage, the *atrium* serves as a place of waiting for pilgrims, catechumens, excommunicates, and others. In the middle of the atrium is a well, *cantharus*.

In the basilica proper the *main house* (the *navis*) is for the congregation; the aisles forming side ways, so as to leave the central nave open for the perspective view and free from the multitude on procession days.

The *transept* helps in very large churches to distribute the crowd and gives space besides for the ministering clergy. The wings are often reserved for people of high social standing.

The *apse* contains the altar and in episcopal churches the bishop's chair and seats for the higher clergy.

In basilicas built for commemorative purposes the *tomb of the martyr* is often contained in a cave beneath the altar, a *crypt*, called *confessio*.

ITALIAN MONUMENTS. — ROME.

Basilica of S. Peter, fourth century, destroyed during sixteenth century.
Basilica of S. Paul fuori le mura, fourth century.
Sta. Maria Maggiore, fourth century.
S. Clemente (restored 1099-1118.)
Sta. Maria in Cosmedin.
Sta. Linforosa, fourth century, and others.

RAVENNA.

S. Apollinare nuovo, sixth century.
S. Apollinare in Classe, sixth century.

PARENZO.

Cathedral, seventh century.

FRANCE.

St. Martin at Tours, St. Denis at Paris, and others.

In Spain, Germany or England, Early Christian basilicas existing only in parts.

IN THE ORIENT.

Church of S. Demetrius at Salonichi.
Ch. of Holy Mary at Bethlehem, fourth and sixth centuries.
The Syrian basilicas.

ÆSTHETIC ASPECT OF EARLY CHRISTIAN ARCHITECTURE.

In concentric buildings the form is in itself decorative.

Harmonious proportions are of much consequence.

The poor material needs to be coated in order not to appear too mean for its purpose.

All emphasis is thrown upon the attractive appearance of the interior. Difference in this respect from the pagan temple

Form is subordinated to color in the decoration of Early Christian churches, especially the Byzantine. Precious material; painting upon stucco; gilding; mosaic.

The columns are the chief architectural feature; of precious material; mostly robbed from pagan edifices. The imitation of pagan work devoid of artistic perfection. The corrupt Corinthian capital. Crude blocks of trapezoidal shape introduced. Arches.

The decoration of the exterior is very meagre. The rough masonry undisguised. Blind arcades with pilaster-strips. Frieze under the edge of the roof. Small windows with closures of peculiar design. M. Wergeland.

(To be continued.)

NIGHT REFUGE FOR WORKINGMEN AT TURIN.

FOR the purpose of giving shelter over night to poor, destitute and honest artisans out of work, whose spirit forbids them to beg or accept the degrading hospitality of a police-station, a few prominent, liberal-minded and public-spirited gentlemen of this city came together in 1887 to organize the *Società per gli asili notturni in Torino*, that is, a society to offer night refuge to homeless workingmen.

A solid stone edifice of massive structure, built for and used during the exhibition of 1884, was leased and changed for the purpose. The opening of the refuge took place in January, 1888.

The "tramp," in the American sense, is altogether unknown on the Continent of Europe. When men leave their country, they generally do so to find work elsewhere: as a rule, they are equipped, if not with a certificate as craftsmaster or apprentice, at least with strong arms, a keen desire to work, and such papers are as requisite and necessary to give documentary evidence of having been born of Christian parents, christened, vaccinated, confirmed, and having the permission from their home authorities to travel for a given term. A wanderer not possessing such papers is not kindly treated by private persons, while local officials will try hard to rid themselves of such an unwelcome visitor by expediting him with despatch to the next provincial district, and so on, until the unfortunate reaches his home again. Occasionally, a truly philanthropic society will assist him with funds enough to go to the United States.

The refuge is beautifully located on the corner of Via Burdin and the Corso Massimo d'Cozelio opposite the Valentino Park. It is a high one-story building. To the right of the large entrance-hall are the office and the disinfecting and wash rooms; the reading-room, dormitory, and two smaller rooms for families are on the left of the entrance.

The building is heated by steam, lighted by gas, has running water and ample water-closets of the latest improved method — accommodations which even in good Italian hotels are often sadly missed.

The receiving hour is at 6 P. M., or later, according to the season. The newcomer's name, nationality, his age, religion and trade are registered — all nationalities, ages, and religions are treated equally. After an obligatory shower-bath, clean clothing is given him, while his own, in the meantime, is disinfected and cleaned, by chemical process, if necessary. Then he has leisure to go into the reading-room or can smoke in the adjoining garden and under the portico. A physician is at hand to attend to little ailings or wants, the medicaments for which are taken from a house chest standing in the office. At 9 P. M. a large bowl of meat soup, with plenty of vegetables, is served to the hungry, and at 10 o'clock the doors are closed and the inmate can take to his bed, thirty of which are in the large dormitory. The beds are such as are used in the new barrack hospitals in Germany; they are of iron, have a mattress, two pillows, linen sheets and covers, blankets and a comforter, all scrupulously neat and clean. The dormitory is well ventilated above and has tiled flooring. For the whole house, the proverbial phrase "clean enough to eat off the floor" holds good.

Should a father or mother with children apply for admittance, two separate rooms are set aside for such purposes, containing each three beds. Single women are never admitted.

At 7 o'clock A. M. in summer, and at 8 in winter, the inmate is obliged to leave the refuge, the place receiving a thorough cleaning and overhauling every day.

No police or other surveillance is kept; two attendants look after all that is necessary. The refuge, however, is in telephonic connection with the *Questura* (police headquarters) and the principal hospitals, in case of emergency. So far, these places have never been appealed to.

The applicant is permitted to use the refuge four consecutive nights, but this can be extended to seven nights. He is permitted to return to the refuge after a lapse of two months.

That these temporary inmates are grateful is evident; that they are often very talented, also, is equally apparent, for the portico and reading-room contain many fine sketches in water-color and crayon made by poor artists, who found here a night's rest and a plain meal on their way across the Alps to or from the Eternal City and elsewhere.

The Institute is purely a private enterprise, supported by contributions of annual, honorary, and perpetual members, who pay $50 and

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$100 respectively. The institution once received a subsidy from the Government of $200, and from the municipality of $300. It receives gratuities, also, from the foreign consulates represented in Turin, with the exception of the commercial agent of the United States, who has no funds at his disposal for such purpose, notwithstanding the fact that twelve "stranded" Americans received the hospitality of the refuge in 1893.

During the last fiscal year, 8,500 lire ($1,640) has been the total income from which 13,877 people were given shelter, representing 30,827 nights.

Next to the Italians, the largest contingent applying for admission are French (1,222), Swiss (490); Germans and Austrians follow, and even Egyptians and Moors are received in the institution.

The management of the refuge is non-sectarian. Catholics, Protestants, and Jews work together, solely for one object — the good of their fellowmen.

It is simply astonishing what private charity has done and still does to lessen the misery in his city. In regard to distributing charity systematically and practically, the benevolent Turinese is far ahead of this kind in all cities I know of — in Europe as well as in the United States.

The Asilo Notturno Umberto Primo is a model institution in its way, equal, if not superior, to those I had the honor to describe in my report of May 1, 1894,[1] and worthy to be known and imitated in so benevolent a nation as the United States.

W. E. MANTIUS, *U. S. Commercial Agent.*

TURIN, September 29, 1894.

COLUMBUS, THE CAPITAL OF OHIO.

It was on that memorable morning in 1812, when for the second time Americans took up arms against Great Britain, that Columbus became a village instead of a dense, unbroken forest, inhabited only by many wild animals and a few Indians. Just across the sluggish Scioto River, which bisects the City of Columbus as the Cuyahoga River divides Cleveland into the East Side and West Side, was situated the little village of Franklinton, which has long been merged into the City of Columbus. It is, indeed, strange that Ohio, with all her generous acres must have crowded close together, with only a stream to separate, two villages of seemingly no importance.

But there was a purpose in founding the village of Columbus. The site was not particularly advantageous for commercial purposes; there was no better land on the east side of the river than on the west side of Franklinton, the county seat in Franklin County, which was organized in 1803, and which had been frequently mentioned as the future capital of Ohio. The only reason for the founding of Columbus was that men who owned the land on which it now stands had been given assurance that under certain conditions the capital of Ohio would be located there. Ohio wanted a capital at the centre of the State. Chillicothe was the original seat of Government, but it had never been made the permanent one, and the Government soon after became migratory. In 1810 the Legislature met in Chillicothe. In 1811 it met in Zanesville, and the following year it returned to Chillicothe.

For a year or two prior to 1810 the Legislature realized the importance of having a permanent meeting place, and in 1809 Matthias Corwin, of Warren County, introduced a resolution to appoint a committee of five to select a site. In the following year the Speaker of the House appointed James Findlay, W. Silliman, Joseph Darlington, Reisin Beall and William McFarland as the members of the committee, and the first meeting was held at Franklinton, the prospective capital, on the 1st of September, 1810. The committee entered into its work zealously, for the State owned no public buildings, and its valuable documents and records remained from year to year in rented buildings, at great hazard. The committee examined Franklinton and several other sites offered. Moses Byxbee and Henry Baldwin made a proposal for Delaware. James Kilbourne offered Worthington, now a suburb of Columbus. John and Peter Sells laid out inducements for the location of the capital at Dublin. In the report to the Legislature the Commissioners recommended a site twelve miles above Franklinton, on the west bank of the Scioto River, where the town of Dublin is now.

Nothing was done in the matter by that Legislature, but at the beginning of the next session a Company having for its members Lyne Starling, John Kerr, Alexander McLaughlin and James Johnson made the proposition that if the seat of Government were established on the high bank east of the Scioto River, opposite Franklinton, in Township 5, Range 22, of the refugee lands, and would begin to hold its sessions in a town to be laid out thereon by the Company before December, 1817, the Company would:

First. — Lay out a town on the lands on or before July 1, 1812, agreeably to a plan presented to the Legislature.

Second. — Convey to the State by general warranty deed, in fee simple, such square in the town, containing about ten acres, for public buildings, and such lot of ten acres for the penitentiary and dependencies as a director, or such persons as the Legislature should appoint, might select.

Third. — Erect and complete a State-house, offices and penitentiary, and such other buildings as should be directed by the Legislature, to be built of stone and brick, or of either, the work to be done in a workmanlike manner, and of such size and dimensions as the Legislature should require; the penitentiary and dependencies to be completed on or before January, 1815, and the State-house and offices on or before the first Monday of December, 1817.

At the completion of the buildings, the Legislature and the Company were to appoint workmen to examine and value the whole building, which valuation should be binding; if it should not amount to $50,000, the Company would build such other buildings as the Legislature might direct to the maximum value, but if the valuation was in excess of $50,000 the Legislature was to indemnify the Company.

Thus it was that the four men, confident of the future greatness of Ohio, made a proffer to the State amazingly generous for those times. Even with a war of indefinite duration impending, they were willing to link their fortunes with the fortunes of Ohio and carve from unbroken forest lands a town which they believed was destined to greatness. How well they reckoned, the substantial city of to-day is witness. It has grown from nothing in 1812 to the third largest city in Ohio, and that without having the natural resources with which its two superiors — Cleveland and Cincinnati — and its inferior — Toledo — were endowed.

The first sale of lots was made June 18, 1812. The village developed rapidly. Shops and houses sprang up, and Columbus was a thriving village when the new buildings were finished. The village in its early days had scant mail facilities. Traffic passed to the south, passing through Zanesville, Chillicothe and Lancaster. Mails came in periodically on horseback until 1816, when Philip Zinn contracted to carry mail weekly between Columbus and Chillicothe.

The founders of Columbus set energetically to work on the State buildings. On the southwest corner of the beautiful park which now contains the State Capitol the first State building was erected, in 1813. It was of brick, made from clay taken from an Indian mound near Capitol Square. The building was a very plain structure, 75 feet by 50 feet, and two stories high. A second building, 150 feet by 50 feet, was erected two years later for State offices. The timber was cleared from the entire tract in 1816, and the square was inclosed by a fence, which was soon destroyed, and the square became a common, continuing as such for about ten years. The third building, which served in part as a house of justice, was built in 1825, when the court was removed from Chillicothe. The buildings were completed nearly two years before the contracted time, and the Legislature, in 1816, passed a law establishing the capital at Columbus, beginning the second Tuesday of October in that year. The State offices were removed from Chillicothe, and the first session of the General Assembly in the new building was held on the first Monday in December.

The first penitentiary building was erected in 1813. It was of brick, three stories high, 60 feet by 30 feet. The prison yard was 100 feet square. A large prison was constructed five years later.

Surmounting the main door of the State-house was a stone slab, artistically engraved with the following inscription:

"General good the object of legislation perfected by a knowledge of man's wants and nature's abounding means applied by establishing principles opposed to monopoly. — *Ludlow.*"

The State-house was burned February 1, 1852. This slab, the only remaining relic of the building, was saved intact, and now occupies a prominent place in the rotunda of the present Capitol.

The old buildings having become inadequate to the needs of the State, a large building was planned, and in 1842 work was begun on the building which now contains the executive record offices of the State. Fifteen years were required for its building, and its cost was $1,359,121. It is of limestone, and was built by convict labor. At the time of its opening, in January, 1857, five years after the destruction of the old buildings, it was the finest and largest Capitol in the United States. It stands in the centre of the same plot originally deeded to the State. It covers two acres of land, and is surrounded by beautiful lawns. Its style of architecture is not beautiful, but its solidity, ruggedness of character and homely grandeur are still impressive. — *Cleveland (Ohio) Leader.*

BOOKS AND PAPERS.

It is seldom that a translation of a technical work is, on the whole, as satisfactory as the book recently published under the title of "*Rational Building.*"[2] The writer has produced more than a mere transcription of Viollet-le-Duc's well-known treatise. The idea and the methods of thought as well have been translated, so that, notwithstanding the presence of a few of the hall-marks which show that the subject matter was originally conceived in a foreign tongue and under foreign associations, the work as a whole is now essentially an American book. Such a translation forms a valuable addition to the library of every one who wishes to appreciate the vital principles of mediæval French architecture, though for that matter the principles which Viollet-le-Duc deduces from the French churches and cathedrals are quite as applicable to the spirit of the

[1] Printed in *Consular Reports* No. 168 (September, 1894), p. 35.

[2] "*Rational Building*": Being a translation of the article "Construction" in "*Dictionnaire Raisonné de l'Architecture Francais*," of Eugene-Emmanuel Viollet-le-Duc: By George Martin Huss, Architect, Member of the Architectural League of New York. New York: Macmillan & Co., and London, 1895.

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Renaissance or Classic architecture as to mediæval art. There is hardly a work in existence to-day which treats of construction in so broad and rational a method, which considers the true genius of the skeleton of a building in its relation to the finally completed structure and which elucidates so understandingly the fundamental theorem which is the basis of all true design, that good architecture always implies good construction.

It is hardly necessary to cite from a work which is so well known in its original, in order to demonstrate its value. It is an essential part of every architect's education to master this article on "Construction," even if nothing more of the great dictionary is studied. It seems strange now to read Viollet-le-Duc's frantic defence of mediæval architecture, which crops out at places all through the volume. A single quotation chosen at hazard will show his independent spirit, and will also make manifest in a degree the reason for the little success he met with in the estimate of his own countrymen. Analyzing the principles of the flying-buttress, which was perhaps the most marked constructive feature of the Gothic work, he says — "Formulas are good to exhibit the knowledge of him who gives them, but they are almost always useless to the practical worker; the latter allows himself to be directed by his instinct, his experience, his observations, and that feeling, innate in every builder, which shows him what he ought to do in each particular case. We do not hope to make builders out of those to whom nature has refused that quality, but to develop the instincts of those who possess it. One cannot teach good sense or reason, but one can learn to make use of the one, and to listen to the other."

And again, after a very sarcastic comparison of modern domestic architecture with what was attempted in the twelfth and thirteenth centuries, he makes the epigramatic statement, that "centuries are like individuals, they wish always to be considered gifted with the qualities which are wanting in them and care very little for those they do possess." In fact, the whole treatise abounds with what might be called side-lights of mediæval architecture which are apt to stick in the memory and lend a piquancy to the treatment of so dry a subject as Construction, which would have been impossible to perhaps anybody but a Frenchman, and a Frenchman such as Viollet-le-Duc. But after all, the value of the work is inductive rather than direct. We are not trying to reproduce cathedral architecture now, fortunately. We think we are on a much better line and that the work of to-day, drawn as it is so largely from the Renaissance, while retrospective in its character, has quite as much vitality and a great deal more freedom than was ever possible with the Gothic style.

Viollet-le-Duc was a strange production in many ways. He was essentially a man with a self-conceived mission who felt himself called upon to take up the defence of what was considered barbarous and unworthy in past architecture, and who in the compass of his short life was enabled to see a whole nation aroused in spite of itself, to a respect for and a proper preservation of, the historical monuments which the genius of mediæval art had scattered so freely throughout France. But his best title to our honor is not his mission so much as his methods. He is honored to-day probably a great deal more in England and the United States than he ever was or ever could be in France. Hardly a man in modern times has toiled more conscientiously and systematically than he did. He fairly worked himself to death, and yet, although all his life was given to the study and development of the principles of architecture, he hardly left a mark on the creative art of his country. There is no doubt that France has been influenced by him, but his greatest ability was as an antiquarian, a writer and a story-teller. We may add, also, as a draughtsman, for it is rarely given to one to develop so distinct a style in architectural drawing as was produced by Viollet-le-Duc. Whoever has had the good fortune to go through the extensive collection of his works which was exhibited at the Palace of the Trocadéro some years since, can form an idea of the versatility of his genius in the graphic arts; he could draw anything in any way and with almost any medium. Some of the studies he made during the last months of his life at Lausanne, of the adjoining Alps and the glacier formations, were marvels of careful, comprehensive and appreciative drawing, while the style which he particularly developed for illustrating his works almost revolutionized architectural draughtsmenship. And yet, as an architect, he was a complete failure. It is doubtful if he could have earned a decent living at his profession, and consequently in him is presented the strange anomaly of a man who was absolutely past-master of everything relating to Gothic architecture, who was thoroughly conversant with everything that had been done, and apparently all that had been thought about churches and cathedrals of mediæval times, who appreciated most keenly to all appearances the spirit which gave rise to all of the Gothic glories, and yet who, when he was given a distinct opportunity, seemed incapable of rising above the dead level of mediocrity. Witness the Parish Church of St. Denis, or the screen in St. Germain l'Auxerrois, or even the much-talked-about decorations of the apsidal chapels in Notre Dame. Viollet-le-Duc affords a most striking illustration of the fact that architecture is more than book learning, is more than the ability to draw, that there is something beyond it all which constitutes the art and which a person may appreciate fully, may be able to describe absolutely, may analyze and classify in all its functions, and yet be absolutely incapable of applying it independently. Probably if he had been more of an artist, if his creative powers had been more nearly equal to his intellectual and investing ability, the world would never have seen his wonderful "*Dictionary of Architecture.*" Had he been a creator as well as an analyzer, had he been able to apply all of his exhaustive knowledge to actual problems, undoubtedly there would have been a revival of Gothic architecture in France which might have been very far-reaching in its effects. As it was, he simply was able to show to the world that the accepted standards of the Renaissance were not unique, and that in one sense art is independent of age, association, or antecedent for its fundamental principles.

It seems strange that more of his dictionary should not have been translated before this into English. As far as we know, this is the only English translation of the article on "Construction," and though most of our architects understand French sufficently to get a very large degree of help from reading Viollet-le-Duc's writings in the original, it is to be doubted whether many of them would thoroughly understand and appreciate the little niceties so well in the original as they would in the translation. It is to be hoped that the success of this translation will lead to others from the same work, notably the articles on "Decoration" and on "Glass Work," both of which are only less valuable than the article on "Construction."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE DINING-ROOM: HOUSE OF GEORGE A. DRAPER, ESQ., HOPEDALE, MASS. MR. JOHN PICKERING PUTNAM, ARCHITECT, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

HOUSE OF GEORGE A DRAPER, ESQ., HOPEDALE, MASS. MR. JOHN PICKERING PUTNAM, ARCHITECT, BOSTON, MASS.

ENTRANCE-HALL OF THE SAME.

DESIGN FOR TOWN-HALL, CLAREMONT, N. H. MR. H. LANGFORD WARREN, ARCHITECT, BOSTON, MASS.

IMPERIAL APARTMENT-HOUSE, ST. LOUIS, MO. MR. WM. ALBERT SWASEY, ARCHITECT, ST. LOUIS, MO.

[Additional Illustrations in the International Edition.]

THE ENTRANCE-HALL: HOUSE OF GEORGE A. DRAPER, ESQ., HOPEDALE, MASS. MR. JOHN PICKERING PUTNAM, ARCHITECT, BOSTON, MASS.

[Gelatine Print.]

PARLOR FIREPLACE OF SAME HOUSE.

[Gelatine Print.]

ENTRANCE-HALL OF THE JUNIOR CONSTITUTIONAL CLUB, PICCADILLY, LONDON, ENG. MR. R. W. EDIS, ARCHITECT.

FRIENDS' COLLEGE, SAFFRON WALDEN, ENG. MR. EDWARD BURGESS, ARCHITECT.

DESIGN FOR A ROMAN CATHOLIC CATHEDRAL. MR. F. SANG, ARCHITECT.

THE ground-plan of this church is based on the form of a Latin cross, like most of the cathedrals and many abbeys and other churches of the West. In the East the Greek cross, more approaching a square, is adopted, such as we see in Santa Sophia at Constantinople, St. Mark's at Venice, and many others. In the present plan the oblong, with its cross branches, forming the transepts in the shape of the Latin cross, has been adopted. The arrangement of piers, carrying the vaulted roof of the nave and its surrounding ambulatory, remind us in their solid treatment of the best specimens of Roman and Romanesque ecclesiastical buildings up to the twelfth century in Europe, and give the beholder a sense of strength combined with beauty, which some may prefer to the clustered pillars of the later Gothic period. The guiding principle of the earlier masters was simplicity and dignity. Their golden age began in Europe in the time of Charles the Great and succeeding emperors and kings of the Holy Roman Empire. Some of the works they ordered are lasting monuments of beauty and strength, and combine Christian cheerfulness and deeply devotional feelings. Some of the Italian masters, though influenced by Northern Gothic, did not entirely abandon the hints given to them by the old masters of

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Romanesque architecture, and, though slightly adopting in their works some Gothic features, successfully united the gracefulness of the South, such as can be seen now in Italy.

The dimensions of the interior of the building, shown on the plate, are: Length of the interior of the cathedral, 465 feet from inside of main entrance to back of apse; the breadth through transepts from inside of south side to north side entrances is 320 feet; the span of the dome is 116 feet; the height of dome is 168 feet; the nave is 50 feet wide and 112 feet high to crown of arch. The ambulatory on the ground-floor (for professional purposes) is 10 feet wide. A similar ambulatory or gallery surrounds the cathedral on the first floor, and also is arranged around the edifice.



[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

MURAL DECORATION *IN SITU.*

NEW YORK, N. Y., July 23, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In these days when current literature is padded with so much sterile æsthetic twaddle and inflated verbiage, Mr. W. B. Richmond's paper on the "Decoration of St. Paul's," England, printed in your last issue, comes like a fresh breeze from the mountains. Such practical essays from men who have the literary, as as well as the artistic, faculty are invaluable, both to the profession and the laity. The history of Mr. Richmond's undertaking from its inception, his preparatory studies, his failures, his successes, are all told with a frank precision utterly free from offensive egotism, that must prove of great utility to all who are interested in the art of mural decoration. It is to be regretted that such a model discourse should be confined to the pages of a technical journal.

While his whole paper teems with sound doctrine, there is one principle on which he particularly insists. It is that all mural work should be executed *in situ*. This is a principle that our very best men, painters and architects, are constantly ignoring; and, if conclusions may be drawn from the present trend of things, will probably continue to ignore, unless a very stout resistance be opposed to the fatal tendency. If it may be written without vanity, I have been preaching this doctrine of execution *in situ* for years, not only in your willing columns, but in others, and in conversation, too, perchance *ad nauseam*,— one always fears to injure a good cause by excess of statement. Yet the joy of meeting with corroborative testimony from good authority is so keen, that I must mount my hobby-horse once more. Hear what Mr. Richmond says: "I made up my mind, once and for all, that during winter as well as summer, we would work *in situ*, and not any more fumble away at such child's play as executing a decorative work away from its conditions of environment,"a practice I believe to be quite fatal to successful decoration, and involving considerable loss of time and expenditure of energy," etc. It can safely be asserted that no mortal man, even with great experience, can invariably grasp the complexity of decorative conditions, except on the spot. Certainly within the range of my own observations, which are necessarily limited, I cannot recall but two or three — if as many — bits of monumental or important domestic painting, where really good word has not been marred by obvious decorative errors directly attributable to studio execution, and which surely would have been avoided had the work been executed in place. Naturally, I do not include those cases where a picture has been called for, independent of the architecture, though framed by architectural mouldings. Nor do I refer to qualities of design. As Mr. Richmond observes, one must wait a century for their just appreciation.

It is this *in situ* work that makes the Italian mural decorations architecturally so good. Even that of a bad epoch. It becomes *de facto* part and parcel of the building. Nevertheless, our very best architects are constantly bolstering this pernicious practice of studio-made decoration, a modern method — if occasionally the Venetians be excepted. From the financial point-of-view — a very important point to-day — it would, doubtless, be a good deal cheaper to discard all indirect methods (not forgetting the great Philistine horde of middlemen, drummers and the like) and to let our experienced artist directly superintend all mural painting, even the humbler kinds; *for he would know how to eliminate all useless labor.* It is to be hoped that the new Roman School, planted in the midst of the stupendous mural decorations of all ages, will open the architectural and artistic eye.

While there are always honorable exceptions, few of those who are in a position to know will gainsay the statement, that wittingly or unwittingly, our architects, contractors, the clergy, perhaps the so-called decorators themselves, by the encouragement of unsound methods, by yielding to the spirit of commercialism, by disheartening the artist and by stimulating the "lowest bidder" have pretty nearly killed stained-glass, *as an art* — an American industry that but a few years ago gave such great promise. Mural painting in all its ramifications is now seriously threatened, unless those who hold its destinies in their hands come to the rescue.

FREDERIC CROWNINSHIELD.

THE MASSACHUSETTS STATE-HOUSE.

BOSTON, MASS., July 27, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — So long as the last Legislature remained in session the determination on the part of some of our citizens to accomplish the destruction of the Bulfinch State-house was so carefully veiled that it was hoped the iconoclasts had seen the error of their ways; but soon after adjournment the old warfare on the building was renewed. The attack was not direct — it consisted mainly of clever insinuations, so vague that it was hardly possible to reply to them. Fortunately, however, there are sufficient facts in the case as well, and it is to these I desire to call attention. Practically every official statement which has appeared in print within the past month has obviously been intended either to convey the idea that at last the time has come when the Bulfinch State-house *must* come down, or else to discredit the report of Messrs. Cummings, Andrews and Whitcomb, the special Commission.

On June 20, the State-house Commissioners sent a "warning" to the Executive Council (which, by the way, was not signed by the practical man on the board), calling their attention to the possible danger attending the occupancy of the front portion of the State-house during the summer, saying that it was evident that the process of excavating and underpinning must be attended with more or less danger to the wall above and the safety of the building. It is interesting to know that the architect of the Annex gave the writer a rather different reason for recommending the abandonment of the front building. He apprehended no danger from the collapse of the wall, or the structure as a whole, but said that the rear windows of the old part were usually filled with lookers-on who were liable to injury from falling material, etc., and that as the elevators must necessarily stop running, and the main staircase be closed, it would be both uncomfortable and inconvenient for the occupants. Most excellent reasons for vacating, but rather different from the "warning" of the Commissioners who gave it to be inferred that the whole structure was liable to collapse. But this same letter calls attention to another interesting feature. It says the walls must be underpinned to a depth of more than thirteen feet, which naturally leads one to ask why, even if the rear wall was in such a precarious condition, it was necessary to go to such a depth? Certainly, not to reach hard-pan, as any one familiar with the site will allow, and surely a little room might be spared from a sub-cellar of the commodious annex were there a disposition on the part of those in control to help the old building in its struggle for existence. After the occupants had been safely removed the contractors started in to underpin the wall, it being understood that they had a contract to do the work. They dug down the thirteen feet or more under the the west end of the wall, without placing a single shore or blocking under the building and in face of the fact that this part of the hill is filled with pockets of sand — a splendid foundation when properly confined, but which when not properly secured is liable to run out and do serious damage. After doing this ingenious piece of work, they wrote to the Commissioners and architect, saying, "Under the circumstances we feel that we cannot undertake the responsibility of underpinning the wall." It would have been a better statement to have said: "Under the method which we have adopted we cannot underpin the wall, and we advise you to employ some one who is used to such work and is willing to take the precautions and adopt the methods customary in such undertakings." But they go farther and say, "In making estimates for underpinning this wall we had assumed from the report that it was in a reasonably fair condition." Usually assumptions of this kind do not cut much of a figure when a builder has undertaken to do a job of this kind, and until they give some better explanation we will "assume" that, either they agreed to do a piece of work they were incapable of doing, or else they introduced this bluff to get out of the financial cavity in which they had found themselves deposited. There is no wall which skill and money cannot underpin.

But more than this: the contractors undertake to discredit the report of the special Commission and to use it as a shield. The specification of this special Commission distinctly states that it makes no provisions for underpinning "the rear or north wall which will be taken care of by the Commissioners having charge of the additions." This exception was made in view of the fact that the architect of the Annex said that provision had already been made for taking care of this part of the work, and it was so shown on the drawings, and furthermore the contractors are well aware that with the limited time allowed for the examination of the building it was practically impossible to examine the foundation of the wall in question, as it was buried deep under the ruins of the Bryant addition.

Now, a word as to the sham foundations which have been uncovered. Mr. Cobb, whose efforts to *save* the old building should be as warmly commended as his efforts to *alter* it should be condemned, has stated the facts clearly and accurately. This bad work was no part of the original structure: it did not seriously impair its strength, and the fact of its existence does not affect the assertion that the wall can be successfully underpinned. The statement that the

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sills of the building are rotten does not call for anything but ridicule — no brick building has wooden sills — and the fact that a piece of rotten wood was found under a dwarf interior wall, which carried no superstructure and was of very recent origin, call for no comment, unless the Executive Council, to whose chamber this valuable discovery was carried, were led to believe that the stability of the gilded dome was dependent upon such material, in which case, a slight investigation will dispel any such mistaken ideas. And here it is well to say, that the weight of the dome is not carried on the rear wall, but on the cross walls, with which the builders of the Annex have no business to meddle.

After these various letters and warnings had been issued, we were told that the difficulty in underpinning the rear wall would be solved (?) by building an entirely new wall outside and independent of the wall of the old building. This is not what the Commissioners were authorized to do by the Act, (Chap. 190, Sect. 2) and it is unnecessary to call attention to the fact that in order to carry out the work as now proposed, it is practically necessary to underpin the old wall, and do the most difficult part of the work which the contractors claimed was impossible.

Whatever may be the outcome of this "attack in the rear" on the old building, and however thoroughly may be carried out the work of building a proper underpinning, which is now being built since public attention has been directed to the matter, the affair must go into the history of the fight for preservation, as an effort to discredit the report of the special Commission, and as one of the many attempts to mislead the public into thinking that it is not only impracticable, but impossible, to preserve the Bulfinch State-house.

For two successive years the Legislature has said, in no uncertain voice, "Hands off the Bulfinch Building." Let us hope the Commissioners will heed the wishes of the great majority of our citizens who wish the building preserved. They have done many things they ought not to have done, but in the future let us hope they will leave undone what they have proposed to do — and not let the vision of an expanded front and a "stilted" dome lead them to consign the hub of our universe to the untimely end which overtook its neighbor, the mansion of Governor John Hancock.

Thomas A. Fox.

EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

Cathedral of San Francisco, Chihuahua, Mexico. — The Cathedral of San Francisco, in the City of Chihuahua, Mexico, deserves to be placed on the list of the wonders of the world. Beautifully located on the principal plaza of the city, its slender, graceful towers rise high above the trees and glisten cool and white against a background of bleak mountains and bluest sky. "Graceful, massive, beautiful, magnificent," exclaims every visitor; but if the grand cathedral itself is extraordinarily attractive, its history is no less so, for it is as strange as if made during the days of the pyramids. Two hundred and nineteen years ago, in 1675, "Chihuahua, the place where things are made," was only a lively frontier Catholic mission. The cathedral was built on ideas borrowed from both the Moorish and the Gothic architecture. The rich façade, in its elegance and purity of complicated filigree, contrasts agreeably with the severer style of the rest of the grand mass. It is the work of an artist who was sentenced to death for some crime, but was promised that the sentence would not be carried out until he had completed ornamenting the front of the cathedral. For twenty-one years the artist stood upon the platforms and cut into stone his beautiful dreams; and for twenty-one years armed sentinels paced the walks down below, and conveyed him to and from his prison. At last, old, broken down and sick, he notified the authorities that his work was done and he was ready to die. Then came pardon, banquets and honor with mocking rapidity, but it was too late, and his eyes closed before he reached the ship that was to carry him to sunny France; and to-day, even his name has been erased from the manuscripts, and from the cathedral that is his monument. As the walls arose slowly, thousands of men, soldiers and slaves, brought dirt in rawhide bags on their backs and slowly and laboriously built up huge inclined planes all around the building. No scaffolds or derricks were used in the construction of the shell, but each stone was pushed and pulled up the long inclines and to the summit of each wall and tower by human hands, toiling under a tropical sun and smarting under the lash of cruel task-masters. As the towers rose to a height of over one hundred and fifty feet, the inclines from each were over half a mile long, and the dirt fell over and covered the church, and by the time the towers reached their full height of over two hundred feet, the church had disappeared in a vast mound of earth. For seven more long years the patient workers toiled to remove the mountain they had themselves built up, sack by sack, and thus dug out the marvel they had constructed. In 1886 the roof of the church was crowded with Mexicans watching the progress of the battle between their forces and the troops of Maximilian; but they hastily climbed down when a cannon ball cracked the big bell in the northeast tower. Two years ago a mining man offered to give the church a new bell for this cracked one, which he wished to send to the Columbian Exposition; but an examination proved the interesting fact that the bells had all been cast in the towers when the church was built, and that now there was no way to get them out without tearing the towers down. — *Florida Citizen.*

Government Control of Water-power. — An issue which has a wide and most important bearing has arisen at Appleton, Wis. The Government has ordered the local electric light and power company to entirely cease using the water of the Fox River, and the city found itself temporarily without either street-car or lighting service. The quantity of water used by the company is said to be about 6,000 cubic feet for three hours daily, which is hardly more than is now running over the Government canal and actually wasted; but the Government order is peremptory, and the only thing the company could do was to equip its station with steam as promptly as possible. Some of the large paper and other mills of the city were affected by the prohibition, and there has been a wholesale ordering of engines and boilers, as it is quite evident that such a crisis as the present must be reckoned with in the future. Many of the neighboring towns will feel the deprivation severely, as the profits of manufacture will be materially cut into by the necessity of installing steam plants, and some of the smaller manufacturers will be in a bad plight. The situation, however, is accepted philosophically, as the action of the Government was for the public good. While navigation is still possible on the lower river, the lake supply is steadily diminishing and threatens to be so depleted within a few weeks that the navigable traffic will be stopped. The incident shows that the Government has come to realize the gravity of establishing an organized control over the water-powers of the country, and the principle of this initial step will doubtless be extended to other enterprises, both contemplated and in actual operation. For instance, the proposed canal between Lake Michigan and the Mississippi River is estimated to lower the level of Lake Michigan and all the other lakes from three to nine inches, and reduce the body of water now running over Niagara Falls 5 per cent, and ultimately 10 per cent. This would shallow many harbors and make Cleveland an inland city. The carrying-capacity of the lakes is over 30,000,000 tons, representing many millions of dollars of merchandise annually, and the determination of how far this vast commerce is likely to be affected by the canal will doubtless come within the scope of the Governmental prerogative which has just been put in force at Appleton. — *N. Y. Times.*

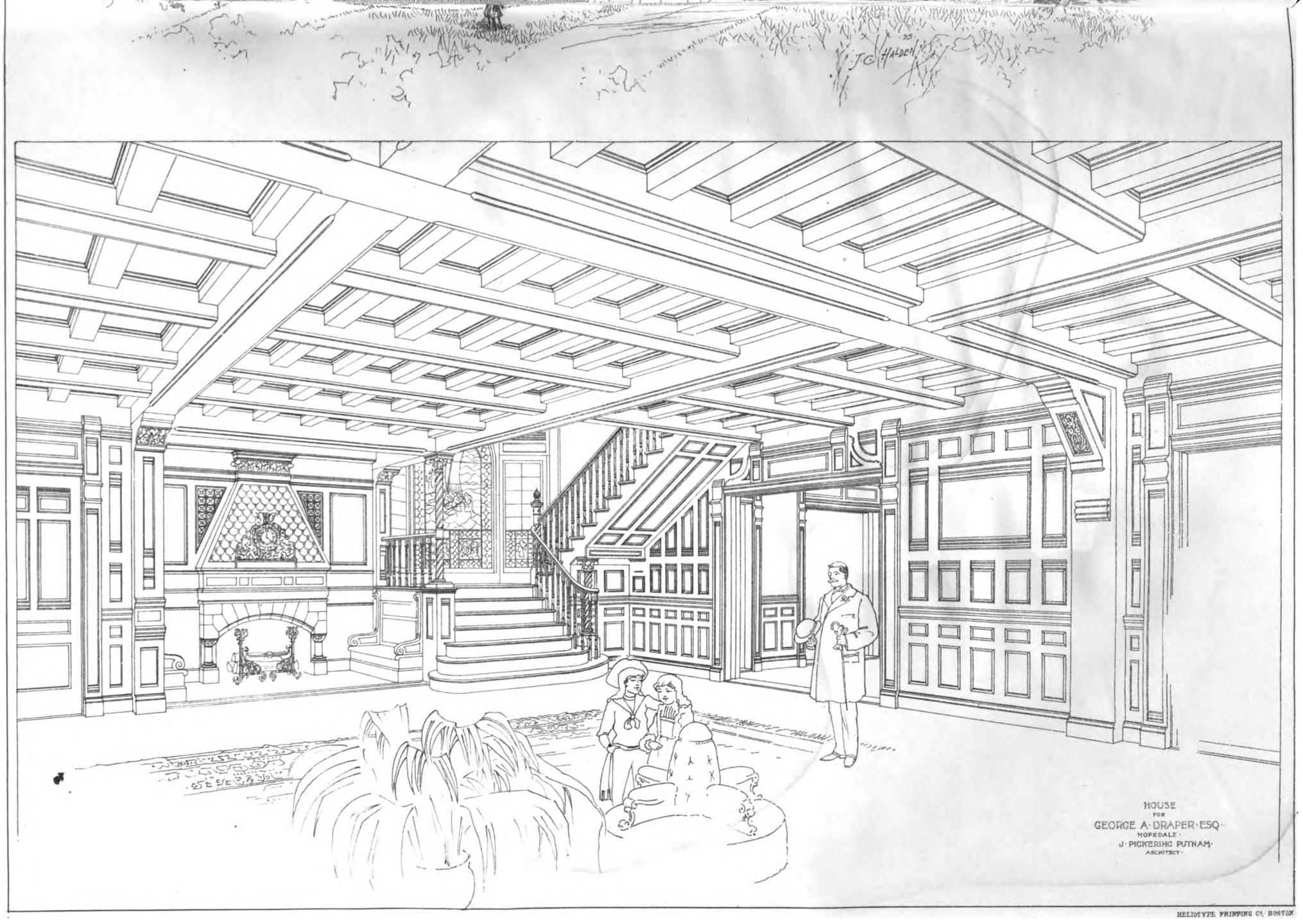
Electric Power on the Pacific Coast. — This week has seen the introduction of electric power to Sacramento from the Folsom Prison dam. Enormous power is furnished by the waters of the American River. This proves that the western flank of the Sierra Nevada will give power to the towns and cities lying along the central drainage of the Sacramento and San Joaquin valleys, and the innovations and changes to occur from this are far-reaching. There is a large percentage of land in both these valleys which cannot be economically irrigated, because of the unevenness of the surface. There are swells in the plains, and the best the irrigator can do is to run ditches around their bases. Cheap power will enable the owner to pump from these ditches at the base of a swell to its top and irrigate in that way, so that hereafter but few lateral ditches will be constructed. Wrought-iron pipe is so cheap as to cost little more, and somewhat less, than a lateral ditch, and the pumping power, when transmitted by water-power from the flanks of the mountains, is going to be so cheap that extensive irrigating systems, supplementing main canals with pipe, are going to be the rule. Besides this, every farmhouse will have cheap power, and the windmill will disappear. The windmill in California is an important auxiliary of a farmhouse, but heretofore it has had to be supplemented with horse-power because of the intermittent character of the wind. Both wind-power and horse-power will disappear, and the electric motor will take their places. The country is well suited, by reason of its topography, for the wholesale application of electrical power in California. From the head of the San Joaquin to the head of the Sacramento Valley is about seven hundred miles, while at short intervals there rush down the western slopes of the Sierra Nevada streams fed by snows, affording a vast water-power all the year round. The high price of coal has handicapped the California manufacturer. After her water-power is converted into electricity it will make her one of the great manufacturing States. — *N. Y. Tribune.*

A Foundation Sacrifice. — It was recently ascertained that the tower of Darrington Church, about four miles from Pontefract, had suffered some damage during the winter gales. The foundations were carefully examined, when it was found that under the west side of the tower, only about a foot deep from the surface, the body of a man had been placed in a sort of bed in a solid rock, and the west wall was actually resting upon his skull. The gentle vibration of the tower had opened the sutures in the skull and caused a crack about two and a half inches long. The grave must have been prepared and the wall placed with deliberate intention upon the head of the person buried; and this was done with such care and art that all remained as placed for at least six hundred years, till, in fact, the storm of December last found out the weak place. The place can still be seen, being protected by a framework of bricks. — *Yorkshire Herald.*

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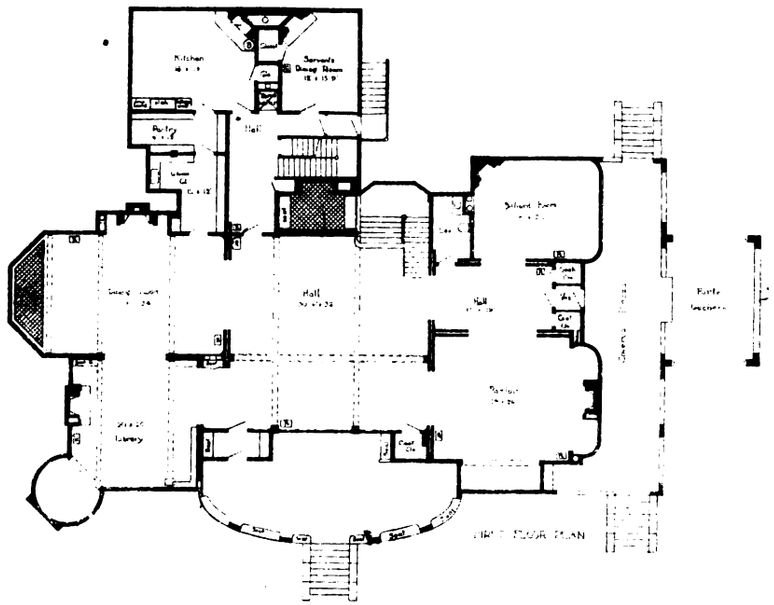
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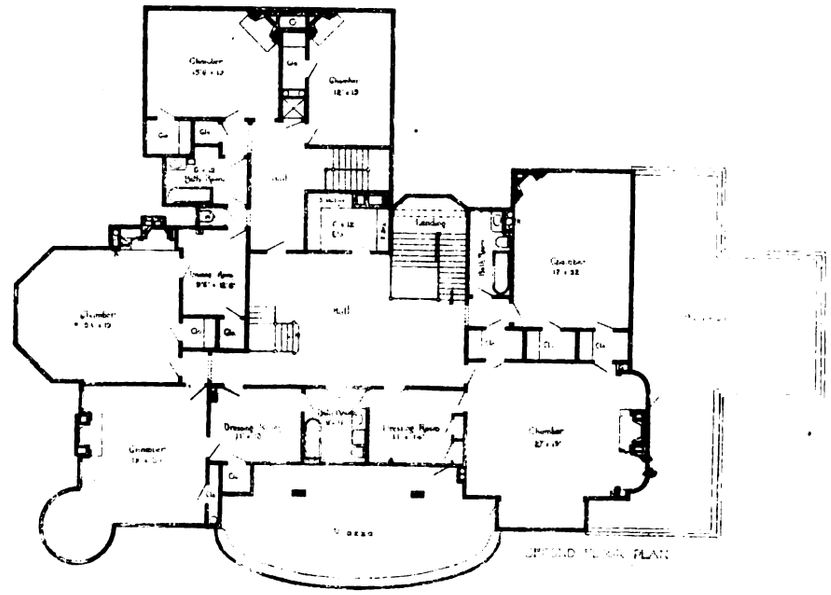


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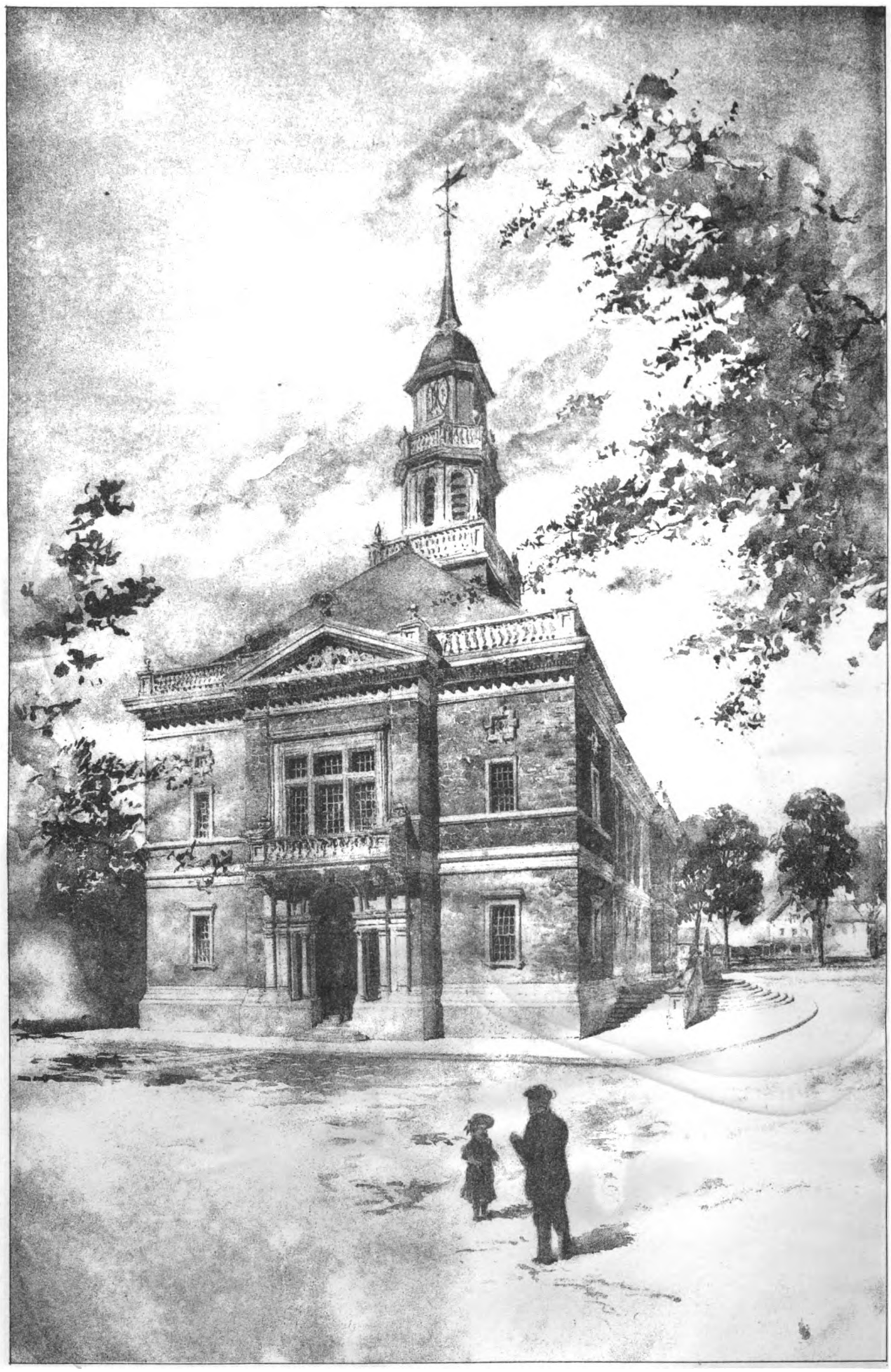


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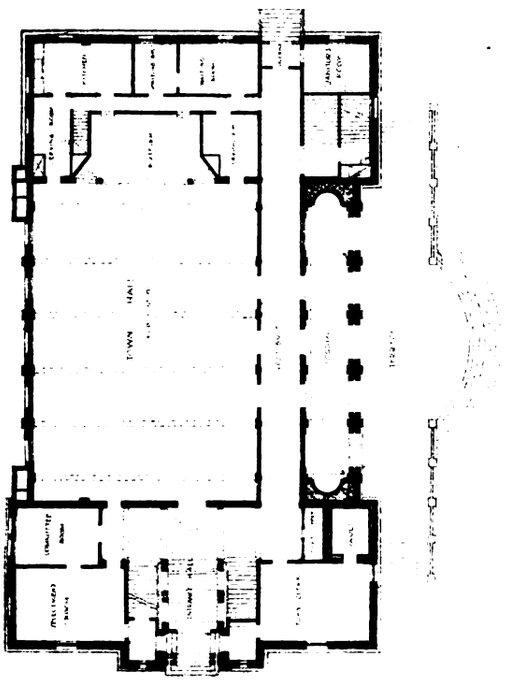


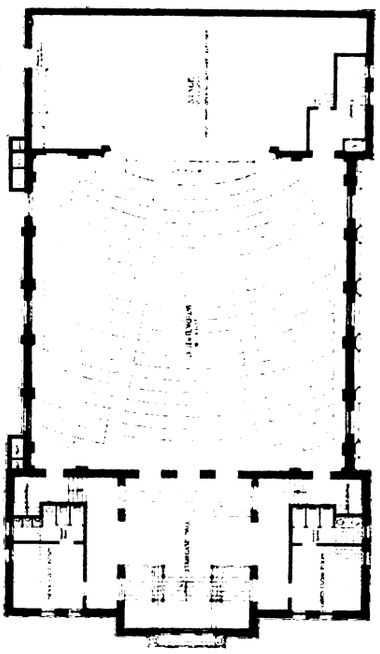
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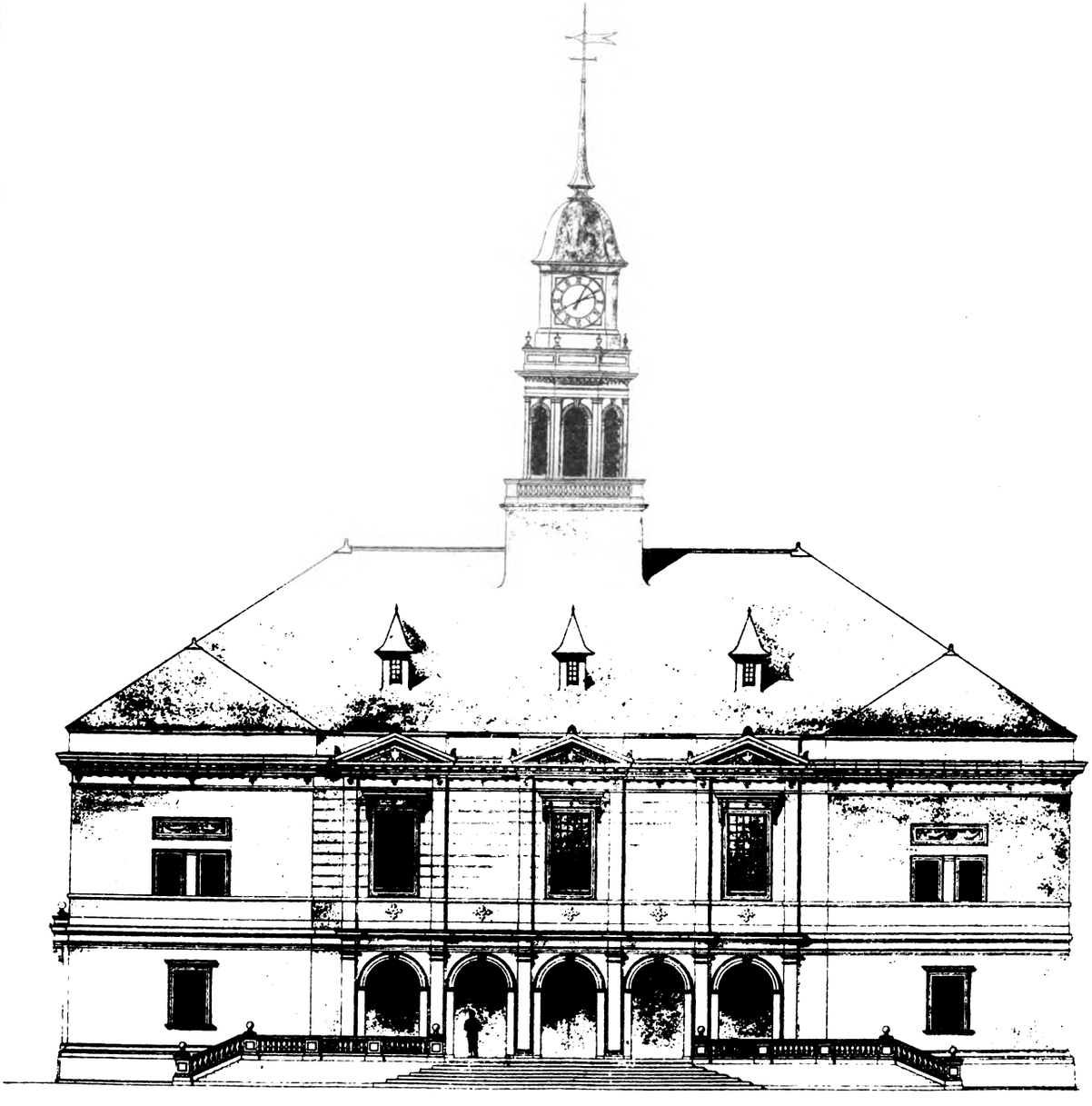
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ALL, CLAREMONT, N. H.

ARREN, Architect.

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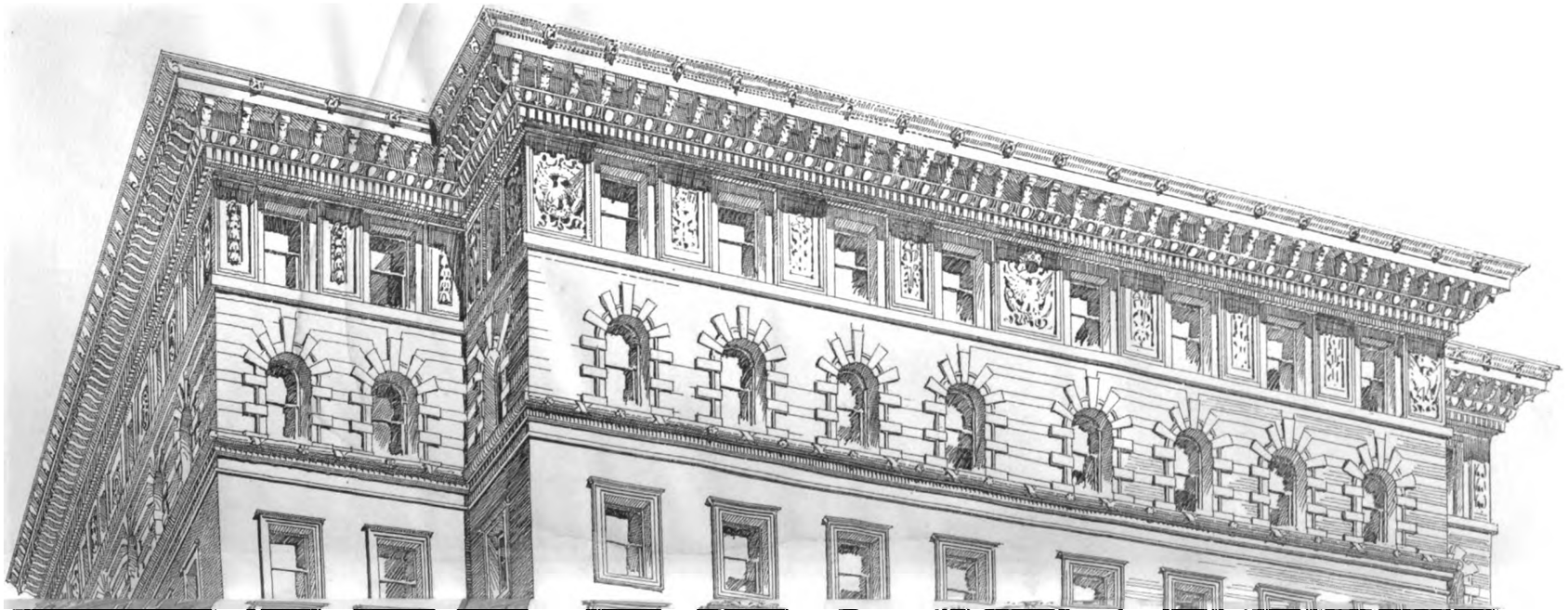
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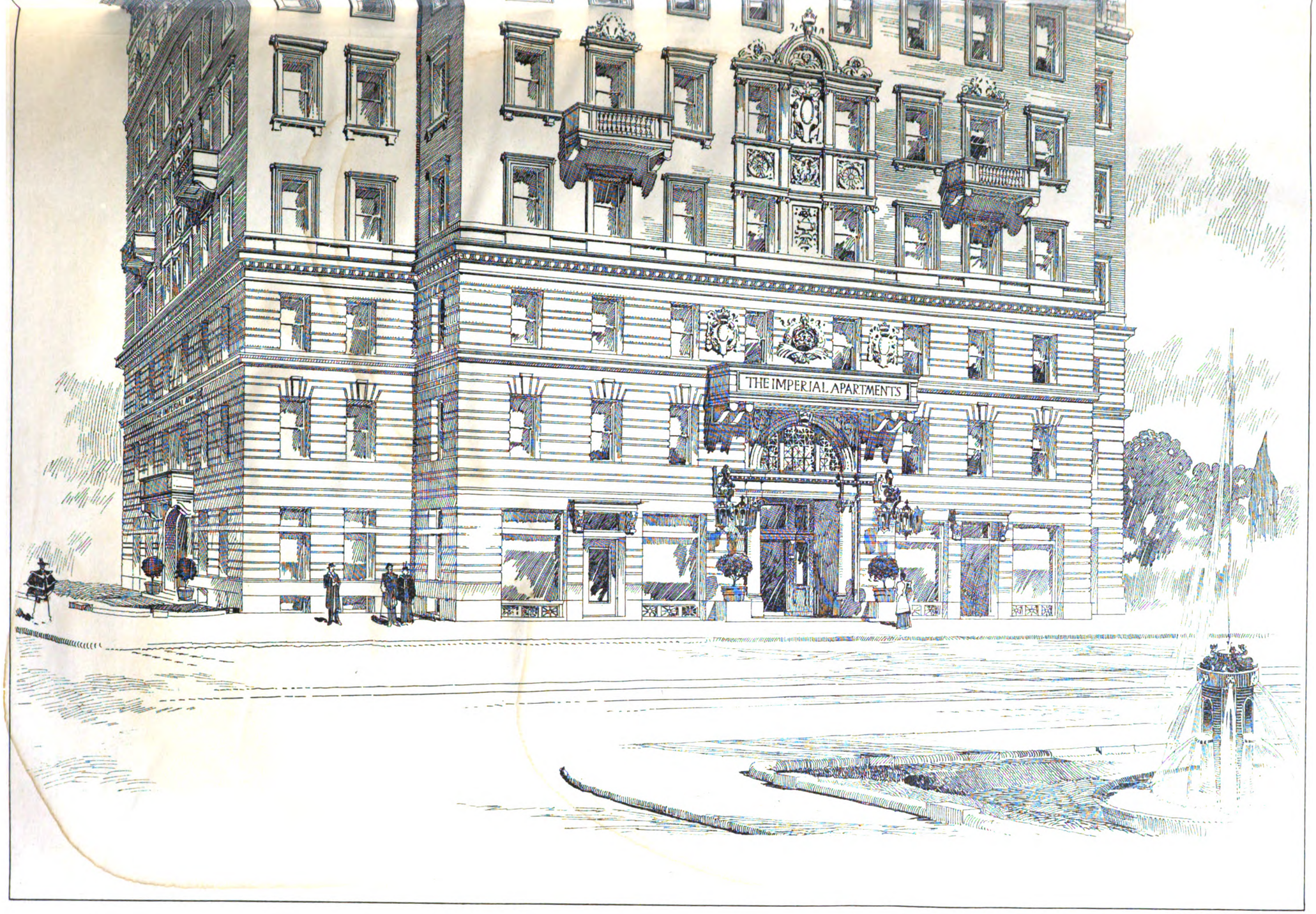
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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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AUGUST 10, 1895.

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WE were rather unguarded, perhaps even unfair, last week in speaking about the Massachusetts State-house, since readers at a distance might naturally suppose that the "north wall" of the old building was a solid and fairly continuous piece of masonry, whereas it is a most extraordinary compilation — the word fits. Originally it was probably as good as any wall in the building, but during its hundred years of existence windows and doors have been cut in it at every floor, built up later and then cut through again. Whole sections have been taken out and replaced with stud partitions, and the wall has been so many times unbuilt and rebuilt that it is difficult to find many lines of continuous untouched masonry where shores could be usefully and safely applied. To shore and underpin such a wall was not a simple task and we do not wonder that the contractors were at first unwilling to attempt it, but we do regret that their letter stating their feeling was made public, since it has been made the starting-point of much misunderstanding. If the structure of the wall now is non-homogeneous, that of the foundation work was unexpectedly peculiar. At the time the foundations were laid trenches of some depth were cut and into these were tumbled boulders of any size and shape and left dry. Upon them was laid a foundation-wall of good character but with nothing to speak of in the way of footings. The construction was good enough, as proved by the event, if the conditions had not been changed. But at some date the grade of the site was lowered several feet and the exposed foundation work was faced up with granite ashlar on the east and, apparently, with brick on the north. This, too, was not altogether unreasonable, but later the basement floor of the building seems to have been lowered to a point below the loose rubble in the original trench, and to keep the foundation in place it was underpinned on the inside with eight inches of brickwork, so that, in some parts, the superstructure of an exterior wall is carried upon a wall of dirt that has never been disturbed, this dirt being kept in place by thin walls of brickwork on either side of it. This appears to be the actual condition, though whether the various steps were as we surmise can not be now determined. As to the crack in the east wall, it is said to be an old one which has opened a little recently, owing partly to the shaking during the demolition of the "Bryant Addition," partly perhaps to the removal of the buttressing walls of that structure and partly probably to a small settlement that took place during the time when the contractors were uncertain how to proceed or whether to proceed at all. But the stage of probable peril is passed and there is little likelihood of catastrophe or any real damage arising during the remainder of the work. This expression of our own belief, however, does not meet the requirements of the situation. By shrewd and selfish manipulation there has been created throughout the State a very positive and wide-spread sentiment of distrust as to the good faith with which the rights of the old building and the desires of the public are being treated. That any such suspicion should exist is a grave injustice to the honorable men who are in charge of the work. It is not possible for either the architect or the contractors to say anything with self-respect, for there are no distinct charges to which they can reply, there are only rumors and insinuations, and even should they make a statement, it would still be possible for those who are responsible for the promulgation of the rumors to point out that as both architect and contractor might reap a pecuniary benefit through the demolition of the old building their statement could only be looked on as a plea in avoidance. The only persons who can take effective action and can do so without loss of personal dignity are the Commissioners, who can act impersonally as public servants, and our whole purpose in forcing attention to the matter is to make it possible for them to act. As the Boston *Herald* very well puts it, "public sentiment is very sensitive in the matter."

A DISCUSSION is going on in the English professional journals about the exhibition of architectural drawings. Unfortunately, there is no doubt whatever of the fact that the public takes very little interest in the average collection of such drawings shown at the Royal Academy, and at the Paris *Salon*, but there is room for a good deal of difference of opinion as to the reasons for this apathy, and we find it ascribed in the profession to a great variety of causes. Mr. T. G. Jackson, who, as is well known, inclines to the artistic, perspective-sketch method of designing buildings, says, according to the *Builder*, that elevations "ought never to be seen at all by any one who is not an architect, because they are sure to mislead if presented as designs." In fact, he thinks that "It should be the object of an architect to have as little to do with elevations himself as possible," and his idea is that perspective sketches, accompanied by plans and sketches of detail, photographs, and, occasionally, models, are the proper means for exhibiting the progress of architecture. We imagine that very few architects on this side of the water will agree with Mr. Jackson that elevations are misleading representations of architectural works. Undoubtedly, a picturesque group, like those which Mr. Jackson likes to design, is best studied in perspective; but a Classical front can only be properly porportioned by careful study in elevation, making, of course, the allowance for foreshortening, and we believe that every unprejudiced architect will say that the elevation gives a truer idea of a flat Classical front than any perspective drawing can do, the eye instinctively translating such a front, as actually seen, into a symmetrical elevation.

MR. ALFRED WATERHOUSE, who, although also a devotee of the picturesque, is as noted for his common-sense as for his professional skill, says that "Part of the space might possibly be devoted with advantage to the exhibition of geometrical drawings, as, indeed, is the case at present with drawings showing the decoration of rooms; but such drawings hardly give the public so true a representation of buildings as perspective drawings do when faithfully prepared. Such perspective views might, however, be more frequently accompanied by floor-plans than is now the case." This is more reasonable than Mr. Jackson's view, although we think, bearing in mind the difference in appearance between, say Mr. Norman Shaw's perspective drawings and his executed work, that Mr. Waterhouse's reservation that perspectives are true representations only when "faithfully prepared," is a very important one. Mr. Waterhouse makes another suggestion, in which we fully concur, that no part of the space in such an exhibition as that of the Royal Academy "should be devoted to sketches of ancient work (however meritorious either the work or its delineation may be)," but all the space "should be reserved for illustrations of the architecture of the current year, or of the immediate past." In this way, and only in this way, as it seems to us, can an annual exhibition of architectural drawings be made interesting to the public. What is new, even if it is not very beautiful, interests all the world; and the assurance that the very latest development of architecture, and that alone, is to be seen at a given time and place, would

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attract many people to whom architecture, as an art, is a total blank. Among the other correspondents of the *Builder*, Mr. Belcher thinks that architectural draughtsmanship has advanced so much of late years as to be utilized too easily to cast a false attraction over unworthy design, and that geometrical elevations should have at least some place; while Mr. Beresford Pite thinks that "the sketches, perspectives and isolated geometrical drawings of the current exhibitions" are "wretchedly unsatisfactory," and that an endeavor should be made to have buildings adequately represented by full sets of plans, elevations and details. Those who remember the extraordinary interest of the exhibition in New York of the working-drawings for the Chicago Fair buildings will agree with Mr. Pite in this suggestion, and in the corollary which he draws from it, that "A great stimulus will thus be given to sound architectural drawing and workmanship, and to fair and square draughtsmanship."

MR. REGINALD T. BLOMFIELD thinks that "any change would be welcome which would recall attention to the fact that architecture deals with design and has exceedingly little relation to mere draughtsmanship," and thinks that the architectural exhibits should be limited to photographs of executed buildings, and to geometrical drawings, or, if perspectives are admitted, that they should be made by the architect who is responsible for the design. Mr. Brydon thinks that, while decorative designs and drawings of old work should not be excluded, they should be in a separate room, and the actual architectural progress of the year shown by photographs, plans and elevations, as well as perspectives, in a room by itself. The latter point is enlarged upon by two or three others, one of whom, Mr. Percy G. Stone, considers that designs for stained-glass and surface decoration do not represent architecture, and that "Designs for Christmas Cards," one of which was shown with the architecture this year, are quite out of place in an architectural exhibition. Several others think that the present exhibitions are too much given up to "smart" perspective renderings, and that geometrical drawings and photographs should find a larger place.

WHILE we quite agree with this opinion, the opportunity seems to be a favorable one for introducing an idea which we have long had: that a field existed, in the annual architectural exhibitions, for encouraging and developing a purely æsthetic department of the art, which has hitherto been almost completely ignored, at least in this country. It will be remembered that Fergusson says, rather contemptuously, that the Celtic races are peculiarly successful in their designs for monuments to the dead; but, while accounting in this easy way for the beauty and poetry of French mortuary architecture, he forgets to notice how greatly and beneficially the habit of endeavoring to express feeling by architectural forms, which is particularly cultivated in designing tombs and monuments, has influenced French architecture. No one can compare the *Architecture Funéraire*, for instance, with such works as Labrouste's Bibliothèque Sainte-Geneviève, or the façade on the Boulevard Saint-Germain of Ginain's École de Médecine, or some of Vaudremer's buildings, without being struck with the idea that the labor of proportioning the projections of bands and cornices, of decorating piers and wall-surfaces to the best advantage, and of managing texture, has been greatly facilitated by the familiarity which all French architects possess with the designing of monuments on a small scale.

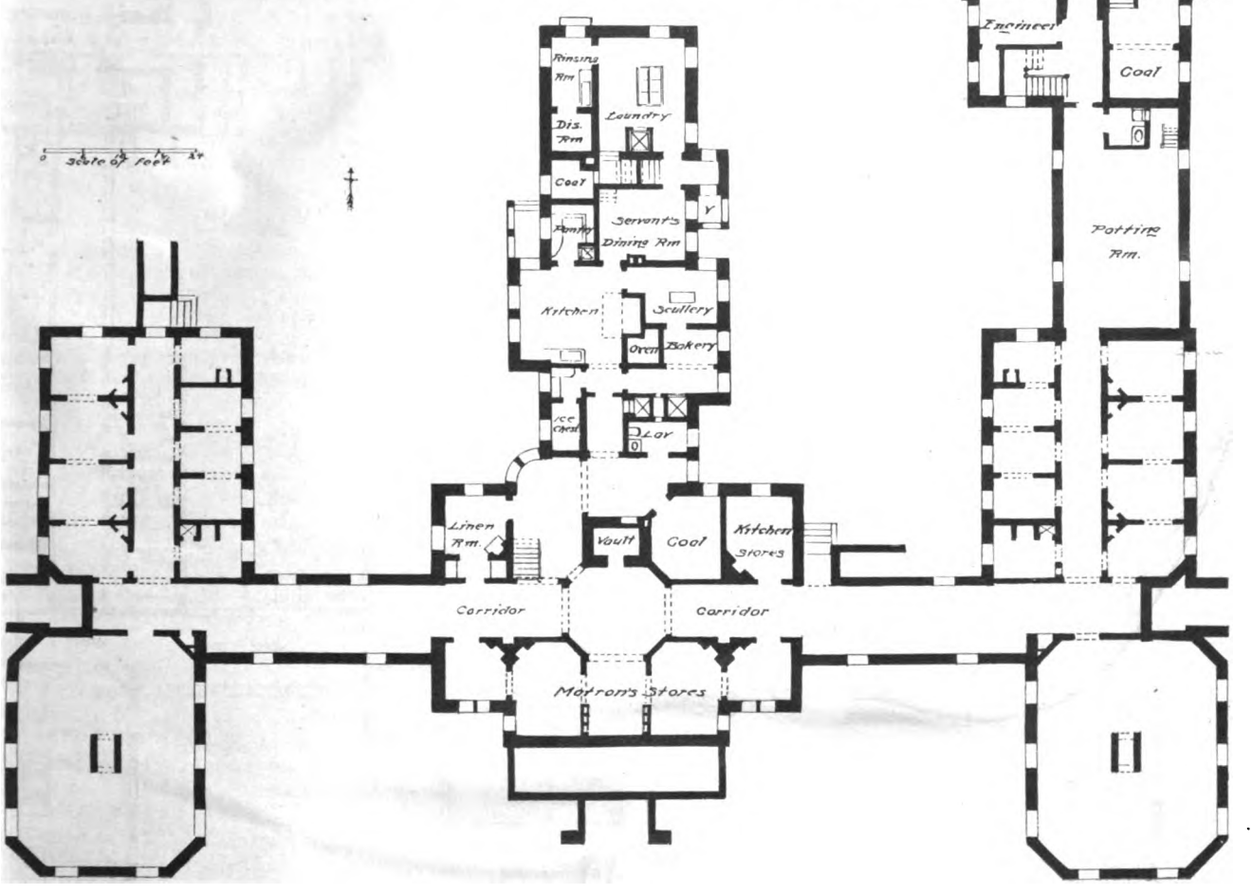
WHILE we are far from urging that architects in this country should make a combined effort to take the business of designing funeral monuments out of the hands of the stone-cutters, we still think that the art of designing such things is one which it is very desirable to encourage in the profession; and, in default of opportunities to put such designs in execution, the annual exhibitions offer a means for cultivating this purely æsthetic department of architecture which should not be neglected. If the young architects who feel within them the capacity for beautiful and expressive monumental design would try their hand, sending the result for exhibition at the League rooms, the effort would be of immense benefit to them, and, as it seems to us, the results would be of interest to the public, particularly if a sufficient number were contributed to collect them by themselves; and it is by no means impossible that the people who saw them might be struck with the idea that it would be better to have such things designed for themselves, than to contract for them with stone-cutters. A small grave-stone affords room enough for the genius of Michel Angelo to display itself; but, if any of our students aspire to dwarf Michel Angelo by the wealth of their talent, they can easily select a larger subject of the same class. In fact, if æsthetic design, pure and simple, could once be recognized as a portion of the mental training of our architects, there would be no lack of suitable problems to be resolved. Any one who wishes to understand better what we mean may turn to Chaucer's description of the coral temple of "Diane of Chastitee," or the Temple of Mars, "of yren stout and stronge," and see what he can make of a set of elevations of these structures. If he does not lay aside the task with a conviction that there is an artistic field in architecture which has been as yet hardly entered upon, we are much mistaken. It is, however, excursions into this field which, as it seems to us, would most interest the public which takes pleasure in pictures and sculpture, for the reason that they would appeal to the same perceptions. No doubt, there is a certain æsthetic satisfaction, to architects, in the contemplation of a masterly restoration, like those shown in the architectural department of the *Salon*, or a Norman Shaw perspective, or a fine set of details; but these things are lost on a public which would easily understand and appreciate the design for the Regnault monument, in the Paris School of Fine Arts, or the Madison Square fountain, or a dozen other things of the same kind, and if it is possible to promote the inclusion in architectural exhibitions of objects which it is desirable for architects to produce and interesting for the public to look at, an effort ought to be made to do so.

THE Society of Engineers and Architects of Westphalia and Lower Rhine recently made a tour in England. Notice was given to the members that the tickets would be ready on a certain date at the Domhotel, in Cologne, and that the start would be made thence the next morning. Fifty-two members made their appearance at the starting-place, and, travelling by the way of Flushing and Queenboro' reached London the same evening. The next day was devoted to South Kensington, Hyde Park and the Olympia Theatre; and, on the same day, eight of the visitors, representing the various societies taking part in the excursion, were entertained at dinner by a committee of the Royal Institute of British Architects, and afterwards invited to a meeting of the Council of the Institute, at which official compliments were exchanged, and two books, "*Köln und seine Bauten*," and the "*Kölner Thorburgen*," richly bound, were presented to the Institute in the name of the Cologne Society. The next day, at the request of the German Embassy, the Arsenal at Woolwich was opened to the visitors. Next came a visit to the Tower, and the Tower Bridge, and the British Museum. Wednesday, the third day, was left open. Some of the visitors improved it by a trip to Oxford and Winchester; some went to Hampton Court, Richmond and Kew, and a small group devoted the day to the London railway stations. On Thursday, the whole party were shown over Westminster Hall and the Parliament-House, and, in the afternoon, visited Westminster Abbey, where they were received by the Dean and his daughter, "Fraülein Georgina," whose "liebenswürdige und sprachkundige" efforts to entertain the visitors seem to have been gratefully remembered. The official heads of the excursion were thoughtful enough to bring with them five laurel-wreaths, tied with red, white and black ribbon, which were laid, after a short allocution by Herr Stubben, on the graves of Robert Stephenson, Sir Gilbert Scott, Charles Barry, George Edmund Street, and Sir Isaac Newton, in the crypt of the Abbey. Afterwards, some one discovered the monument of James Watt, and, as there were no more wreaths, the tourists laid flowers and visiting-cards at the foot of it, while Herr Thometzek, of Bonn, pronounced a short discourse on the inventor of the steam-engine. After viewing the Royal tombs, the visitors left the Abbey, first presenting to "Fraülein Georgina" another copy of "*Köln und seine Bauten*," which had been originally intended for the Institution of Civil Engineers. A visit to the Law Courts and St. Paul's, under the guidance of "Sir Penrose," filled the rest of the afternoon. The next two days were devoted to the Docks, Canterbury Cathedral and various other objects of interest, and on Sunday the party returned, with what the *Deutsche Bauzeitung* calls a feeling of assurance that they had spent a week among friends allied by blood as well as by profession.

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THE MARY HITCHCOCK MEMORIAL HOSPITAL, HANOVER, N. H.

THIS hospital has been designed by its founder, Mr. Hiram Hitchcock of New York, who is also a resident of Hanover, and Trustee of Dartmouth College, as a memorial of his deceased wife. It is an adjunct to the medical school of the college, to which it is a munificent benefaction, as well as to the town and village in which it is placed. It will receive patients also from a considerable section of country in northern New England. The foundations were laid in 1889. The hospital consists of four distinct buildings: a central, or administration block, with an L of two stories and an attic, two one-story pavilions connected with the central building by open corridors, and a surgical building designed for the special purposes of the medical college. The capacity of the hospital is thirty-six beds. The material of the exterior of the buildings is Pompeiian brick, mottled and yellow-grey in color, with a brownish tint, and the ornamentations are in terra-cotta of a light color. The roofs are of light-red Spanish tiles. The general architectural style is based upon early Italian Renaissance. The central building has a hipped roof with dormers; and the roofs of the pavilion wards and of the surgical building take a domed form as a natural expression of the fact that there are large rooms beneath them. These forms also grow out of the use, in the interior construction throughout, of the "cohesive system," in which thin vitreous tiles are employed. The ceilings being formed by layers of these tiles as shallow arches, or as domes over the larger rooms, are built up above with like material to make level surfaces for the superimposed floors. All inner partition-walls are of brick, and there is a unity of fireproof construction throughout, largely of vitreous and non-absorptive material, including the outer walls and the supports of floors and roofs. The arched construction sustains all stairways, etc., so that no iron is used and there is no woodwork except the slight finishing around the windows and doors, and for base-boards. Where wood-flooring is used it is of hard-pine laid upon the fireproof material. The floors of the main halls, in the administration building and connecting corridors, are of marble mosaic; and marble and tiling are used in lavatories, water-closets, etc., for walls, partitions and floors. The general wood finish of the administration building is quartered-oak; yellow-pine is used in the rear extension. All the exterior walls are hollow, and the plastering is applied directly to the interior surface of the bricks and tiling, with a finish of King's Windsor cement, affording a fine, hard, non-absorptive surface, like cement, which does not check or crack. The basement and foundation walls are of granite of the locality. This system of construction avoids the use of heavy iron beams, and brick or terra-cotta arches of great weight, and renders the whole structure substantially a fireproof monolith. It has been recently introduced in America by Mr. Guastavino, an educated Spanish architect, as an adaptation to modern use of the early Italian and Spanish dome-construction. It has been used in part in a number of important buildings, but this is the first one, and the first hospital, in America, which has been planned especially for the use of this method throughout. The architects, Messrs. Rand & Taylor of Boston, have done previous excellent work in the designing of hospitals and asylums. The new Worcester Hospital for the Insane, planned by them, is one of the best examples of the large asylums in America of the modified linear plan that has been so much in vogue in late years. A special pavilion at New Hampshire Asylum is unique and excellent in its design. In this planning of the Memorial Hospital now described, their instructions have been to spare no reasonable expense for whatever might be desirable to make the hospital a perfect one in all particulars. The cost of the three buildings constituting the hospital proper approximate $90,000, and about $20,000 more for the surgical annex. Deducting the extra cost of the special fireproof construction, about $75,000 would remain, approximately, as a basis of comparison with the cost of a "slow burning" building of like capacity as commonly built. The administration building particularly has a special memorial character, and is liberally designed; and the materials have been generously chosen for the whole structure. The plan provides for the convenient enlargement of the hospital by additional buildings and extension of corridors.



BASEMENT PLAN

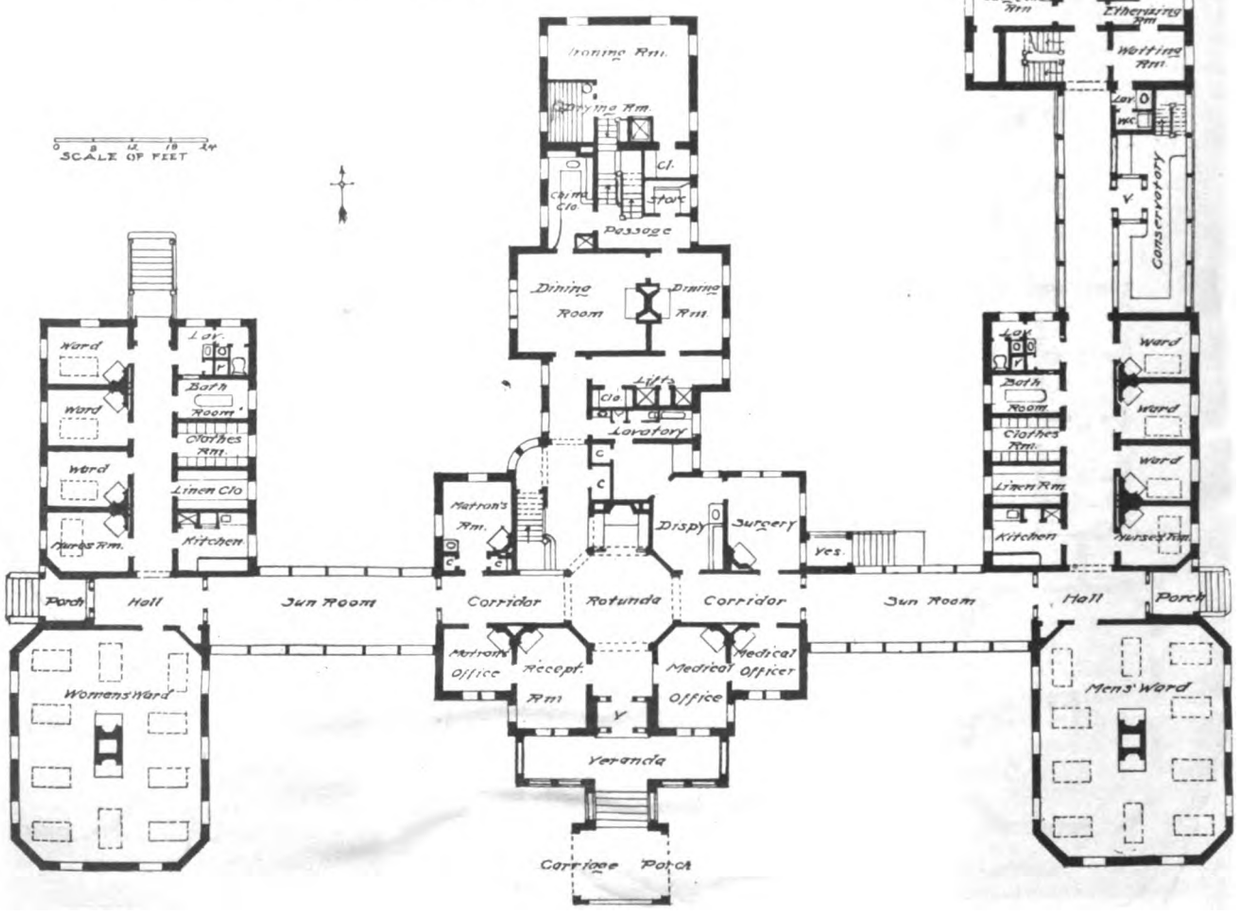
Site and Aspect. — The buildings are situated upon a large open area, including over one hundred acres of land, of which all that is desirable is devoted to the hospital. The aspect is nearly south, with streets at a generous distance on the front and west; and the ground slopes downward from near the building to the east and north. Beyond the street to the west it descends irregularly to the banks of the Connecticut River, one-sixth of a mile away.; and there

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are pleasing views of more distant hills and mountains in this and other directions.

Sub-soil Drainage and Water-supply. — The foundations of the structure rest upon the top of a bed of clay, under a thin surface-layer of sandy loam; next to the group of buildings, on the front and sides, the surface grade is raised to within 4 feet of the first or ground-floor, and slopes gently to the natural level of the surrounding grounds. In the rear, and in the spaces between the buildings, the surface is near the level of the basement floors. The natural drainage is excellent, and the main sewer leads through a settling-tank to a filtration-tank near the river at a distance of half a mile. The sewer is of earthenware drain-tiles, and at a distance from the buildings a flushing-tank is placed. The water-supply is at present furnished in small part by an aqueduct, for drinking purposes and the like; and by collecting the rain-water from the roofs, in cisterns, for common uses.

General Arrangement. — The general arrangement of the buildings, with detail of the ground-floor throughout, is shown by the plans. The administration building is in general dimensions, 42 feet by 58 feet. Passing by way of the *porte cochère* and a broad porch, and as one enters the vestibule and the main hall, the entrance offices are upon either side. A cross hall leads, on the right and left, to the wide open corridors forming the connections with the pavilion wings. These main halls are 8 feet wide. The central rotunda is 16 feet across each way, and forms a handsome feature of the building. In the rotunda are placed the special adornments: in an alcove on its farther side there is a fireplace, and in the Siena marble mantel a bronze memorial tablet. There are seats in the alcove and a low railing at one side. An arched passageway leads to the hall, running backward to the rear extension of the building. The dispensary is next to the surgery, and a work-room in the rear of the former serves as an adjunct for both of them. The matron's living-room and office are on this floor. The rear extension is cut off from the front building on the second floor by a cross corridor with a window at each end; this is at the upper landing of the main stairway; on the first or ground floor the private bath-room and closets are for the male officers, and have independent provision for effective ventilation. Farther back, beyond the trunk-lift, food-lift to second floor, and ventilation and pipe-shaft, the officers and nurses have their dining-rooms, and beyond these, again, are service-rooms and the back stairway which leads from basement to attic. Last of all, and outside of the northern main wall, an annex, consisting of one story and basement, contains the laundry with its special vent-chimney; in the basement are the wash-room, a separate rinsing-room, and a disinfecting chamber. The basement of the administration building is unused, excepting a matron's linen-room, and room for other stores. The basement of the extension contains a cold room, a kitchen, and a bakery with an especially capacious vent-chimney, a servants' dining-room, etc. The second floor of the main building contains eight rooms for patients. Two of these rooms may contain two beds each for children. All but two of the rooms on the two main floors of this building have each a fireplace. In the second story of the extension behind the cross corridors are placed a nurses' chamber, and a service-room with a lift connected with the kitchen. Between these rooms a passage leads to the linen and bath rooms, and separate closets for patients and nurses; these rooms are connected with the large vent-flues in the kitchen chimney-stack. Behind these are servants' rooms on the second floor and in the attic; and in the latter, in front, are three large rooms well lighted and ventilated, with a space for dormitories for ten nurses.



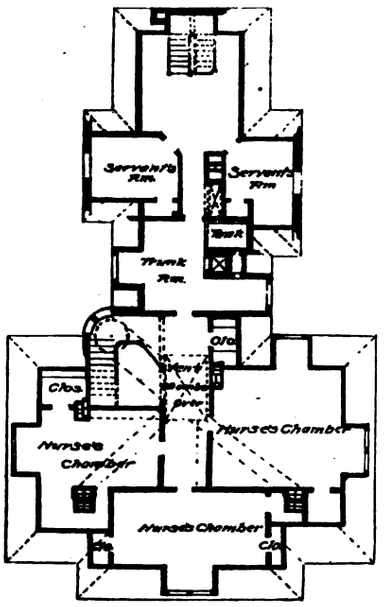
FIRST FLOOR PLAN

Connecting Corridors. — The wings are 35 feet distant from the main building, and their height is 13 feet from the floor of the ward to the eaves. The corridors, with a closed basement passageway, are 12 feet wide, and are so arranged that, when glazed panels are placed between the pairs of terra-cotta columns, sun-rooms are formed. A large room, with glass sides and roof, is formed alongside the corridor between the east pavilion and the surgical building. This will serve as a conservatory.

Pavilions. — The principal sick-wards are in the pavilions. The unique shape of the wards is designed to combine the merits of the round and the rectangular forms. They have the advantage of the latter in the arrangement of the furniture, etc., and the cutting off of the angles at the four corners with the arching of the ceiling gives the practical value of the round ward. The small size of the wards, each containing ten beds, aids in gaining this effect. Each pavilion ward is so placed that all of its walls are exposed to light and air, except a few feet at one corner. The southern aspect permits the entrance of the sunlight all day in each

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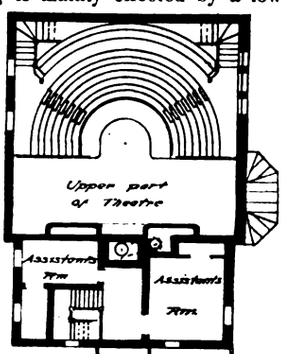
ward alike. The principal ward is 28 feet by 36 feet in the clear: this allows an average of 100 square feet of floor-area for each of the ten beds. The height of the ceiling is 11 feet at the sides of the room, rising by a short curve to near its maximum height, which is 14 feet at the centre, where it is pierced by the central chimney. This allows about 1,300 cubic feet of air-space per bed. The floors of this building are of hard-pine, except in the lavatories, water-closets, ward-kitchen, linen-room and clothing-room, where tiles or marble mosaic are used, and the wood finish is simple and of varnished cypress. All corners are rounded, and grooves for the lodgment of dust are thus avoided. All the corners of the rooms are rounded also, including the joining of the base-boards with the floor, and the corners of the chimney in the large ward. The windows are 3 feet by 7⅔ feet in the clear; giving an average of 19⅔ square feet per bed of effective glazed surface. There are double runs of sash in the windows of all wards and rooms for patients and all living-rooms, as the climate is cold in winter, when a temperature of −25° Fahrenheit is not infrequent. Each pavilion extends backwards and has a low and moderately sloping roof, affording a series of four rooms, 9 feet by 13 feet, looking to the east and west, in each pavilion respectively. The room nearest the large ward is a sitting-room for the nurse, and the others are for single patients requiring some degree of seclusion, etc. Each room has a fireplace. There is a skylight in the corridor. On the opposite side of the building are the service-rooms: first, one for serving food, etc., having a lift from the basement through which is the way to the kitchen; next, the rooms for ward linen and patients' clothing; next, the bath-room, which virtually has two windows, the opening between it and the lavatory extending from floor to ceiling and being only partly closed by a fixed screen. Within this room there is thus formed a small inner room containing water-closet, slop-sink, and their special vent-shaft; this apartment is thus cut off from the common corridor by a practical lobby. The coldness of the winter climate demands some concession in these arrangements and elsewhere, in order to avoid too much exposure of rooms containing water-service. Care has been taken to provide effective and independent ventilation in such places. The basements of the pavilions are open unused spaces with concreted and cemented floors.



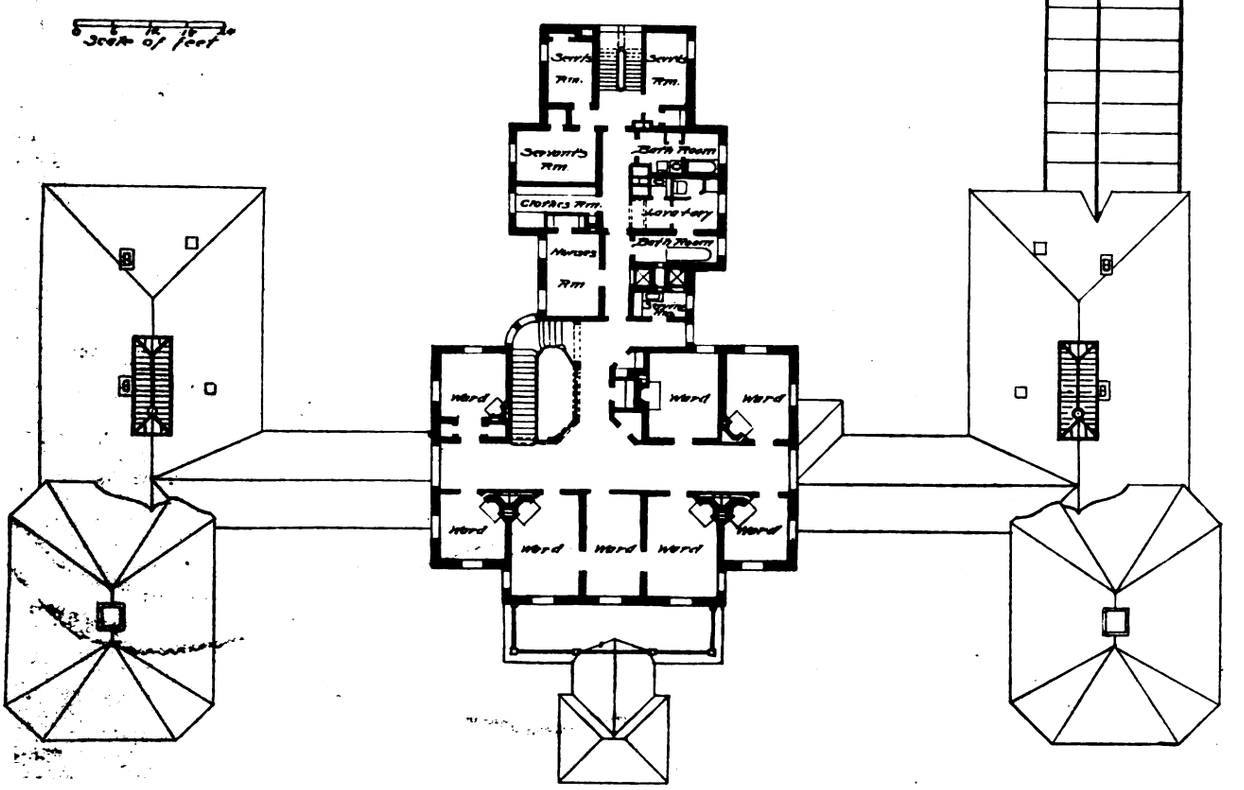
THIRD FLOOR PLAN

Surgical Building. — This is a domed structure mainly occupied by an audience-room, 34 feet by 34 feet, with an amphitheatre capable of seating 125 persons. The accessory rooms include the waiting and etherizing rooms, surgeons' rooms, and, under the seats, a workroom. There is an outside entrance giving access for students. This operating-theatre has a large skylight in the northern aspect of the dome, and at the east end of the floor-space is a broad bay-window affording the side-light sometimes needed. The basement here, with its floor lower than elsewhere, contains the main boiler-room and heating-apparatus of the hospital. There is also a boiler for high-pressure steam for heating water, etc., for baths, kitchens, laundry, etc., and to heat the disinfecting chamber. Outside of this building the surface grade descends enough to afford convenient entrance to the basement. Against the northern main wall of the building is placed a low building, basement-high, with entrance from the ground-level, for the mortuary and autopsy rooms.

Warming. — The rooms are freely provided with fireplaces as indicated in the plans. The heating is mainly effected by a low-pressure steam-apparatus, convertible for use with hot water. The indirect system is employed throughout, with encased coils of pipes well distributed through the basements, and arranged with switch-valves, etc., for mixing cold and warm air. An average of 3,000 to 5,000 cubic feet of fresh air per hour can be easily furnished for each patient. There are four inlet registers in each of the larger pavilion wards.



Ventilation. — The extraction system is employed in the simplest form, by providing chiefly for a natural upward outflow of the escaping foul air. In each of the large wards two ventilating openings with registers are placed in the chimney close to the ceiling, one over each fireplace. The clear outlet area per bed equals the inlet area, and is 72 square inches. The chimney is occupied mainly by a vent-shaft. The smoke-flue of each fireplace is a round earthern pipe worked into the corners of the chimney.

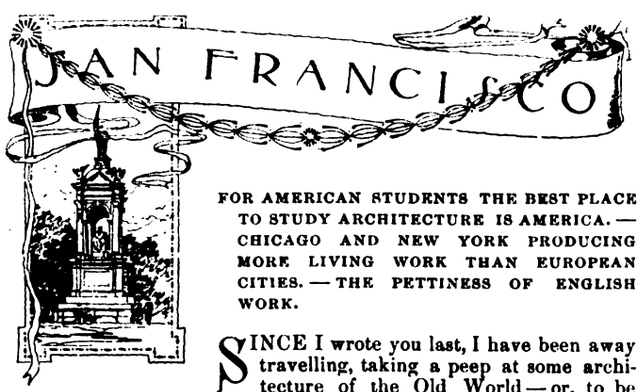


SECOND FLOOR PLAN

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The clear area of the shaft is 32 inches by 36 inches, and steam-pipes are placed in it above the ventilating openings. The space under the domed roof of the building is ventilated by a small opening into the chimney to secure some change of air; and the roof-space is also supplied with a small amount of air through small flues rising in the walls of the building from the basement. Ventilating flues 9 inches in diameter are placed under the floor of the ward, each leading to the base of the chimney from a register under the foot of each bed. For each of the single rooms in the pavilions there is a vent-flue, with top and bottom registers alongside the chimney, leading to a warmed vent-chamber in the roof. There is a like arrangement for all rooms in the administration building, where a capacious vent-chamber under the roof has its outlet in the top of the tower over the main stairway. The special provisions for independent ventilation of all apartments, for water-closets, kitchens and service-rooms, have been noted.

The plumbing and fittings of water-closets, kitchen-sinks, and the like, are all left open to view, or carried in accessible pipe-shafts. All soil-pipes have foot ventilation and extend upwards to the outer air, and they also lead through traps to the sewer system. The water-closets are of the "hopper" form, holding a large amount of water in the bowl, and simple in construction, working upon the syphon principle. — *Edw. Cowles, M. D., in "Hospitals and Asylums of the World."*



FOR AMERICAN STUDENTS THE BEST PLACE TO STUDY ARCHITECTURE IS AMERICA. — CHICAGO AND NEW YORK PRODUCING MORE LIVING WORK THAN EUROPEAN CITIES. — THE PETTINESS OF ENGLISH WORK.

SINCE I wrote you last, I have been away travelling, taking a peep at some architecture of the Old World — or, to be more strictly accurate, at that world that lies between the Old World and the New, that intermediate civilization that was as nothing in the days of the Cæsars.

Among students of architecture in this country, there is a tradition that only in Paris can one learn to compose a building; or, at least, that they can there learn how best to do so. And for the benefit of those who are still uninformed in this manner, I should like to say that the belief ought to be out of date; although, as we all know, beliefs do not always die the moment that their reason for existence has been cut off. So also with this fetichism as regards the architecture that can be learned only in Paris. Twenty-five years ago this belief probably was quite reasonable; but to-day it no longer holds.

In my travel eastward, I stopped at Chicago, and gazed in wonder at its "cliff dwellings" which, say what you will in regard to lack of design, flatness, etc., are among the unique things of the world, and are, although unknown to many, a poem in themselves. Ruskin, in his "*Seven Lamps*," I think it is, has tried to tell us that size is one of the elements that go to make a great building. And in these houses of Chicago we have it without stint, almost to excess in its abundance. Yes, Chicago is one of the unique cities of the world. Edinburgh may be a romance of the feudal times; London, a vast mystery of smoke and people; Paris, a gay and thoughtless assemblage of masqueraders; but in Chicago, which is an ode to labor, we find something more *en rapport* with the main feeling of the times, in these huge factories of human industry, these hives of toil.

Every age must have its controlling influence; that, above all others, on which the heart is set. In mediæval times, in those grand old days of religion, when they builded the Gothic cathedrals, other buildings were scarcely heard of. It was the Cathedral, the Cathedral. All the art and sculpture and prayer and praise, the spare coppers of the poor and the gold pieces of the rich, went to the Cathedral, because thereon the hearts of the people were set, and, as has been said of old, where the heart is, there is the treasure also. So in those times now remote. But to-day there is no force in our civilization so strong as the love of trading. And so in this city of Chicago, it has builded itself from out the hearts of the people into a great ode to labor. A dream of greatness, this city of cliff-dwellers. Now many will be doubtless ready to take exception to this way of putting it. Still I hesitate not in saying that the City of Chicago is a poetic dream and one long to be remembered. If, in the years that are to come, the habitations of men shall again descend to lower levels, these majestic walls of this city of labor shall be spoken of as a tale of wonder; a city whose walls reached almost to the heavens, and whose roofs and turrets were so far from earth that only the purple shadow of their outlines could be traced against the sky. Of course, we all understand that as yet there is scarcely a building in Chicago that is in itself exquisite or monumental; I speak only of the general impression that this city of immense buildings produces on one.

From Chicago I travelled to New York, and from there to Liverpool, London, several English and Scotch towns, and then to Paris and Rouen.

Now what I want to tell students of architecture that have had Paris drummed into their ears until they have begun to think that all they have to do is to go to Paris for a few years and they will be able to do something, or perhaps more correctly, a great thing in architecture, is this: that as regards composition, Paris is not a good school to learn in. That is to say, there are better cities, and one of them is our own City of New York, which I believe is the best.

If one can judge by anything, one can judge by results. Now although they have built a great deal in Paris in the last half century, there is nothing, or almost nothing that I saw, of modern work that is really good; nothing to inspire an architectural student of any ambition or high perceptions. Almost without exception the modern buildings in Paris are uninteresting; nothing heroic, nothing poetic. About all that can be said of them is that they are correct, academical. Just as if in criticising a poet one would say, well, I don't find any poetic thoughts in his work, no idealism; but, then, he spells correctly. Of course, in America we don't even spell correctly in a great deal we do.

Now, what the French can do is to design fabrics, brasses, decorate their rooms, fresco their ceilings, and a great many pretty and delightful things which the student of art or architecture will love to contemplate, and which he will find very useful to him in designing and decorating interiors. But if he wants to learn how to design the exterior of a building better than they are doing in the eastern cities of his own country, he must not go to Paris. That I may not be misunderstood, let me say that of all the modern work that I saw in Paris, the only thing that really pleased me was the foyer of the Opera House, the Arc de Triomphe, the Hôtel de Ville and a few other monumental structures. But along her streets and boulevards, there was nothing. It is only in the old work that one can learn anything. And this is the real value of going to Paris, or more broadly Europe, to study. The people there have just as much need to study the old work as we have. And as far as putting it into practice in modern times is concerned — well, the short and long of it is that we of this country are doing better than they. Many of us may not realize this, for it may be an accomplishment of recent growth. But if, after having travelled in France and England, one steps over to New York, it takes but a few minutes to decide, and to decide in favor of the latter.

In England I spent the evening with a friend whom I had known in this country and one of strong predilection in favor of his mother-country and all that belongs to it, and, being an architect, predilection in favor of English architecture. Well, as the conversation continued, and the evening wore on, it naturally pointed to a climax, and I could observe my friend getting nervous for a decision, a judgment, for all conversations eventually stand for judgment. What do you think of our architecture? "Well, sir, it is too small." That was all I had to say. My friend said the rest, which exactly expressed my thoughts and saved me the trouble. Yes, in England and in France too, there is nothing heroic, no breadth nor mass. In short, no strength. It is all finicky, cut, chopped and otherwise minced up, so that in the end there is nothing left of what, if they had let it alone, would have, at all events, been a very passable wall. It is domestic architecture applied to large buildings. But while the enclosed space has been increased, the mind of the architect does not seem to have expanded in like proportion. In London there is quite a marked improvement in the design of buildings now being erected over that of even ten years ago. And, indeed, although this city is dirty and dingy compared to the French capital, there is far more individuality in its modern buildings, although it may not be able to boast of as many fine monuments as the city by the Seine.

The most beautiful thing I saw in Paris was, I think, the Sainte Chapelle. It is a song of joy, a triumph of delight and unconstrained gladness. Every color a voice, and every voice a song, as of a thousand angels and ten thousand seraphs together rejoicing, singing in rich wild melody a song to Creation. To be inside this building reminds one of that childish delight with which for the first time one looked into a kaleidoscope with its beautiful and multitudinous combinations of colors. Then there is the Hôtel de Ville, the grim old interior of Notre Dame, and the far-away, beautiful dome of the Invalides; sacred when far away, but profaned daily by a scuffling crowd who come with a spirit of familiarity to gaze on the tomb of a departed hero. I do not know who suggested the idea, foolish though it was, of thus monopolizing a sacred building, a house of prayer and praise, to give burial to a warrior. The idea is preposterous. No, there is less than nothing in the idea. For a warrior, the battlefield; for a law-giver, the house of assembly; and for a ruler of men, a place among men; and all things in due proportion and in proper place, but not unto man shall be given those things that belong unto God. "To Cæsar, the things that are Cæsar's," and these only. Wherefore, then, this church of the Invalides to Napoleon?

Well, I must not digress farther from my subject, which is essentially to institute a comparison between the advantages of studying architecture in Paris over those of studying in New York or Boston.

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It seems to me that if one could follow out an ideal course of study, the best way to reach perfection would be to study in this country in one of the two cities mentioned until such time as one had acquired a general knowledge of architecture and the character of the buildings required for our civilization, and a knowledge of what to look for in travel, and then after, say, the age of twenty-five, journey to the Old World, prepared by previous study to observe and adapt the best of what the Old World has to teach us. And that is nearly everything in architecture. And by that I mean her past and not her present practice of it.

In Rouen I enjoyed immensely its beautiful Gothic churches and cathedral, as well as many minor bits of architecture. Rouen's Gothic cathedral and churches impress me in something the same manner as Chicago's business blocks. Why? Because there is nothing frivolous about them. They are earnest, consistent, strong. The one strong with the sense of Religion, and the other great, and strong, and earnest with a sense of Labor. Each the expression, the strongest expression, of two distinct ages, two distinct unfoldments of the human heart; the one dominated by a feeling of religion, the other crowned and controlled by an insatiable love of labor and the many useful and beautiful things accruing therefrom.

To the student of architecture I should say, go to New York. They are doing finer work there than in any city in the world. And by the world, I mean that world in which the tradition of our architecture holds; of older countries we will not speak. But in our western world of Europe and America, New York is doing the best work. They are coming very close to the best examples of the Old World, and as a place to practise and study architecture, it cannot, I think, be equalled. And to those many students to whom this may be a question, I should say, learn all you can in our own City of New York first, and then, if you have time and resources, travel to the Old World, and there learn how in many and diverse manners to clothe the requirements of your own new land in those beauteous garments with which in times past the master-builders in many ages and in many lands tried even as you do, and not without success, to give to the necessary things of life not only use, but also beauty.

Much more I might say about comparative architecture, and remind you likewise that it is largely in his own country that a prophet is without honor. But if I have succeeded in telling you that you can learn architecture as well at home as in Paris, and that this admiration of the French school of architecture is a mistake; that the compositions taught and admired by the professors of the School of Fine Arts in Paris are not as good as your own, and that you ought only to go there to study the old work, or to learn painting, decorations and the other arts of design, and not architecture, I shall have arrived at the impression that it was my intention to make. Without question, there is a breadth and strength developing in our own architecture which it would be a pity to see crushed out or constrained by a slavish adherence to academical lines, which is one of the quite probable results of a young student's learning his fundamental principles in the Old World.

SOCIETIES

NEW YORK CHAPTER, A. I. A.

A SPECIAL meeting of the New York Chapter of the American Institute of Architects was held on Friday, the 2d inst., at 12 o'clock, to take action in reference to the death of Mr. R. M. Hunt, on the call of the Executive Committee, the following members being present: Mr. Upjohn in the chair; Mr. Joseph Wolf, Secretary, *pro tem.*; Mr. Edward H. Kendall, J. W. Moulton, J. Stewart Barney, Bruce Price, S. E. Gage, Napoleon LeBrun, H. J. Hardenburgh, R. W. Gibson and Walter Cook.

Mr. Schickel sent his regrets at not being present.

It was moved and seconded by Mr. Kendall, that the following telegram be sent to Mrs. Hunt at Newport: "The New York Chapter of the American Institute of Architects, now assembled, sends its profound sympathy to Mrs. Hunt in her great bereavement. R. M. Upjohn, President."

It was moved and seconded that a committee be appointed by the Chair to draught resolutions and have them engrossed and transmitted to Mrs. Hunt. The following committee was appointed by the Chair: Mr. Post, Mr. LeBrun, Mr. Kendall, Mr. Bruce Price and Mr. Gibson.

Mr. Bruce Price offered the resolution, which was adopted, that it was the sense of this meeting that the members be requested to attend the funeral in a body.

JOSEPH WOLF, *Secretary, pro tem.*

CHARLES OF BRUNSWICK'S CLOCK. — St. Petersburg has now the wonderful clock bequeathed by Duke Charles of Brunswick to the Swiss republic. The clock has ninety-five faces, and shows the time of day at thirty different places, the movement of the earth round the sun, the phases of the moon, the signs of the zodiac, the passage over the meridian of fifty stars of the northern hemisphere and the date according to the Gregorian, Greek, Mussulman and Hebrew calendars. It took two years to put the pieces together when it was transported to Russia. — *Churchman.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

FIREPLACE IN ENTRANCE-HALL: CATHOLIC CLUB-HOUSE, WEST FIFTY-NINTH STREET, NEW YORK, N. Y. MESSRS. WM. SCHICKEL & CO., ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print issued with the International and Imperial Editions only.]

BY accident this plate was overlooked at the time this club-house was illustrated in June last.

MAHOGANY FURNITURE FOR "HOMECROFT," CHESTNUT HILL, PHILADELPHIA, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

[Issued with the International and Imperial Editions only.]

FURNITURE DESIGNED BY MR. ROBERT BROWN, JR., ARCHITECT, BOSTON, MASS.

[Issued with the International and Imperial Editions only.]

CHURCH CHAIRS DESIGNED BY MR. ROBERT BROWN, JR., ARCHITECT, BOSTON, MASS.

[Issued with the International and Imperial Editions only.]

TOWER OF THE EGLISE DE LA TRINITÉ, VENDÔME, FRANCE. SKETCHED BY MR. W. T. PARTRIDGE, LATE ROTCH TRAVELLING-SCHOLAR.

[Issued with the International and Imperial Editions only.]

THIS tower, work of the twelfth century, is justly considered the most beautiful example of Transition. It is isolated from the church and is about 250 feet high (Joanne gives 80 metres). The restorations made 1871-1882, are by Godineau.

THE MARY HITCHCOCK HOSPITAL, HANOVER, N. H. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

FOR description see article elsewhere in this issue.

OPERATING-THEATRE AND CORRIDOR OF THE SAME.

ST. MARGARET'S HOUSE, ST. LUKE'S PARISH, GERMANTOWN, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

A BIT OF OLD BARMOUTH, WALES.

HOUSE AT LAKEWOOD, N. J. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

STAIRCASE-HALL OF THE SAME.

[Additional Illustrations in the International Edition.]

THE LIBRARY: KELLOGG TERRACE, GREAT BARRINGTON, MASS.

[Copper-plate Etching.]

WIMPOLE HOUSE, WIMPOLE STREET, LONDON, ENG. MR. CHARLES HENRY WORLEY, ARCHITECT.

A CORNER DOORWAY OF THE SAME.

WEST FRONT: ABBEY OF THE HOLY TRINITY, CAEN, FRANCE.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE GRAVE OF CHARLES BULFINCH.

BOSTON, MASS., August 5, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The interest now taken in Bulfinch makes it worth while, perhaps, to point out that the inscription on the tablet attached to the gate of King's Chapel burying-ground, Boston, stating

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that he was buried there, while literally correct, is misleading, as its readers naturally suppose that the celebrated architect's remains are still within.

The fact is that they were afterwards removed by the family to a lot in Mount Auburn Cemetery, where they now rest within a few yards of the grave of Agassiz, and beneath the urn which Bulfinch himself had placed, in memory of Franklin, on the old Franklin Street grass plot, in Boston. DELVER.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

A WATCHMAKER'S EPITAPH. — The following curious inscription, to the memory of George Routleigh, a watchmaker by trade, occurs in the churchyard of Lydford, Devon:

Here lies in horizontal position
The outside case
of
George Routleigh,
whose abiding in that line
was an honour
To His Profession
Integrity was his mainspring and prudence the
regulator of all the actions of his life.
Humane, generous, and liberal,
His hand never stopped till he had relieved
distress.
Sincerely regular were his motions
He never went wrong
Except when set a-going
By People
who did not know his key
Even then he was easily set right again
He had the art of disposing of his time
so well
That his hours glided in one continual round of
pleasure and delight
Till an unlucky minute put an end to his ex-
istence.
He departed this life
Nov. 1802,
Wound up
In hope of being taken in hand
By his Maker
And of being thorough cleaned repaired and
set a-going
In the world to come.

— *Notes and Queries.*

PLACES OF ROYAL SEPULTURE. — Under the circumstances, it is only natural that royal personages who are, after all, constructed of the same clay as we are ourselves, should prefer to feel their bodies safe from being desecrated, dispersed and even eaten; the only way of assuring themselves of that safety being by having their bodies consigned to the bosom of Mother Earth. Must it not, for instance, have been painful in the extreme for that admirable woman, Queen Regent Christina, of Spain, to know that for the first six years of her widowhood her husband's body lay, not in hallowed earth, nor even in his present tomb under the great dome of the Escurial, but remained uncoffined on a stone slab in a cave hollowed out of the rock on which this gloomy palace is built, undergoing a gradual if slow process of mummification? Nor was it until the body had become completely desiccated that it was placed in the sarcophagus that constitutes the last resting place of poor Don Alphonso XII. The Escurial, if sombre, is certainly the most imposing and regal of all the mausoleums of the Old-World royalties. Less stately, but more beautiful as regards site and structure, is the superb Church of the Superga, near Turin, in the vaults of which repose the princes and princesses of the ancient house of Savoy. It is, indeed, a striking monument erected on the very brow of a lofty hill which dominates not only the city of Turin, but the entire valley of the Piedmont. Of Russia's dead emperors, all those who lived and reigned prior to Peter the Great lie in the Cathedral of the Archangel Michael, within the precincts of the Kremlin at Moscow. Since the foundation of St. Petersburg, in the seventeenth century, the Czars and their consorts, as well as the princes and the princesses of their dynasty, have been laid at rest in the church inside the fortress of SS. Peter and Paul on the right bank of the Neva, facing the Winter Palace. The sarcophagi are all empty, merely destined to mark the site of the imperial tombs beneath the marble floor; while far down below the dead bodies of the Russian autocrats are the dungeons in which are imprisoned the Nihilists who are consigned to a fate that can be described only as a living death. San Vincente de Force, the black-and-white marble church just outside the walls of Lisbon, may be regarded as the superga or mausoleum of the reigning House of Portugal. Most of Denmark's monarchs are buried in the Cathedral of Roeskilde, the ancient capital of the kingdom, some twenty miles from Copenhagen. Most of these illustrious dead lie in sarcophagi, but the remains of King Harold "Blue-Tooth," who reigned in A. D. 985; of Queen Margaret, who died in 1730, as well as of several other kings and queens, are built into the centre of the columns that support the roof of the basilica. The members of the House of Orange sleep their last sleep in the vaults of the so-called New Church at Delft, and alone, perhaps, of all royal mausoleums that edifice contains the remains of a dog! It was a pet of William I and had on two separate occasions saved his royal master's life by warning him of the approach of the Spanish assassins, who eventually murdered him in 1584. Another peculiarity in connection with this royal mausoleum is the fact that one of the princes, Alexander by name, half-brother of the present young Queen Wilhelmine, lies there embalmed and buried, wearing an orange silk quilted petticoat! He was crippled from his birth and completely crazy during the closing years of his life, his dementia taking the form, among others, of an invincible objection to that particular branch of masculine attire which has now been usurped by the new woman. In petticoats he lived and in petticoats, according to his express entreaty and command, he was laid in his tomb, where he awaits the Day of Judgment. Unlike the dead of the imperial house of Hapsburg, who all lie in the vaults of the very ancient Capucine Church at Vienna, those of the Hohenzollern are sadly scattered, some of them being entombed in the unlovely and mean-looking Dom or Cathedral of Berlin; others at Potsdam; while the last two emperors repose in a mausoleum at Charlottenburg. The same may be said of England's royal dead, some of whom repose in Westminster Abbey, others in the vaults beneath St. George's Chapel, at Windsor, while some, again, are to be found in the various cathedrals of the provincial towns. Queen Victoria has commanded that when her long and busy life has been brought to a close, her body shall be laid beside that of her husband in the $1,000,000 mausoleum which she has erected over his tomb at Frogmore, Windsor; but if the Prince of Wales has his way, and if the views to which he has recently given expression and which are known to be those of his consort, are permitted to prevail, he will, when his hour comes, be laid to rest, not in a marble or granite sarcophagus, but in an ordinary grave beside the body of his little boy in the rurally picturesque and shady churchyard of Sandringham. — *Ex-Attaché in N. Y. Tribune.*

GEORGE III. AND ELECTRIC CONDUCTORS. — About the year 1778 a dispute arose among the members of the Royal Society relative to the form which should be given to electrical conductors so as to render them most efficacious in protecting buildings from the destructive effects of lightning. Franklin had previously recommended the use of points, and the propriety of this recommendation had been acknowledged and sanctioned by the Society at large. But after the breaking out of the American Revolution, Franklin was no longer regarded by many of the members in any other light than an enemy of England, and as such it appears to have been repugnant to their feelings to act otherwise than in disparagement of his scientific discoveries. Among this number was their patron George III, who, on its being proposed to substitute knobs instead of points, requested that Sir John Pringle would likewise advocate their introduction. The latter hinted that the laws of nature were unalterable at royal pleasure, whereupon it was intimated to him that a president of the Royal Society entertaining such an opinion ought to resign, and he resigned accordingly. This story, though it does not appear to be in print, having been suppressed in deference to royalty, was current at the time among the members of the Society, and there is no doubt of its truth. Dr. Hutton alludes to it in the following extract from his "*Mathematical Dictionary*": — "Considering the great attention that was paid by Sir John Pringle to the various and important duties of his office, and the great pains he took in the preparation of his discourses, it was natural to expect that the burthen of his honourable station should grow heavy upon him in a course of time. This burthen, though not increased by any great addition to his life, for he was only six years president, was somewhat augmented by a fall from which he received some hurt. From these circumstances some persons have affected to account for his resigning the chair. But Sir John Pringle was naturally of a strong and robust frame and constitution, and had a fair prospect of being well able to discharge the duties of his situation for many years to come, had not his spirits been broken by the most cruel harassings and baitings in his office. His resolution to quit the chair originated from the disputes introduced into the Society concerning the question whether pointed or blunt electrical conductors were the most efficacious, and from the cruel circumstances attending those disputes. These drove him from the chair. Such of those circumstances as were open and manifest to every one were even of themselves perhaps quite sufficient to drive him to that resolution. But there were yet others of more private nature which operated still more powerfully and directly to produce that event, which may probably be hereafter laid before the public."—*The Architect.*

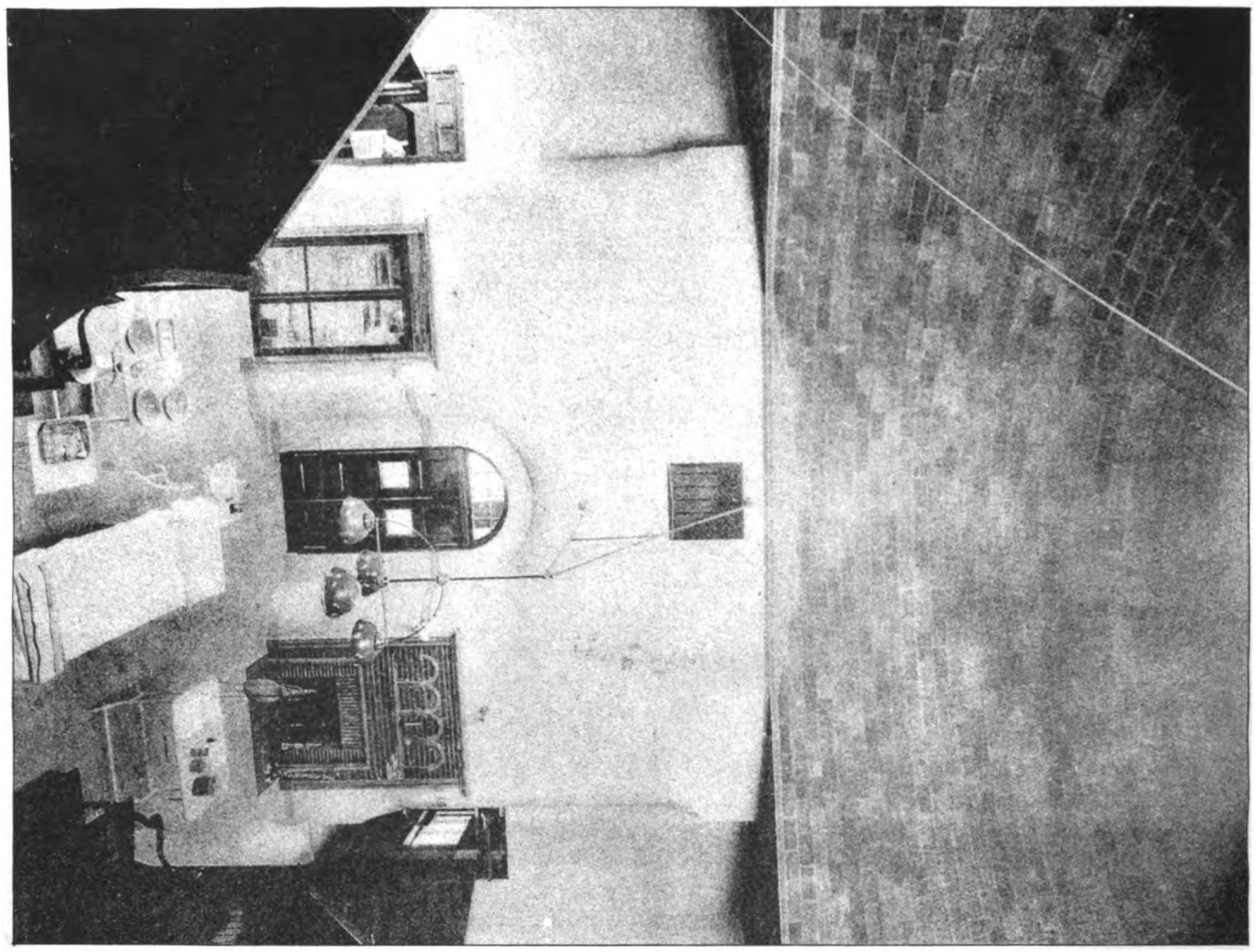
A BIG FLY-WHEEL OF WIRE. — Among the most recent and novel applications of wire, perhaps none has greater interest to the mechanical world than that presented by the wire fly-wheel lately erected at the Mannesmann Tube Company's Works, Germany. Heavy fly-wheels, driven at high velocities, obviously present dangers of breaking asunder from the great centrifugal force developed. The wheel at the factory mentioned consists of a cast-iron hub or boss, to which two steel-plate discs or cheeks, about twenty feet in diameter, are bolted. The peripheral space between the discs is filled-in with some seventy tons of No. 5 steel wire, completely wound round the hub, and the tensile resistance thus obtained is far superior to any casting. This huge fly-wheel is driven at a good speed of 240 revolutions per minute, or a peripheral velocity of about 2.8 miles per minute (250 feet per second, approximately), which is nearly three times the average speed of any express train in the world. The length of wire upon such a constructed fly-wheel would be about 250 miles. The use of paper is also regarded with favor as a face for large fly-wheels, the tensile strength of paper being enormous, and it is quite possible that some of the new big fly-wheels will be built up with a paper rim. — *Hardware.*

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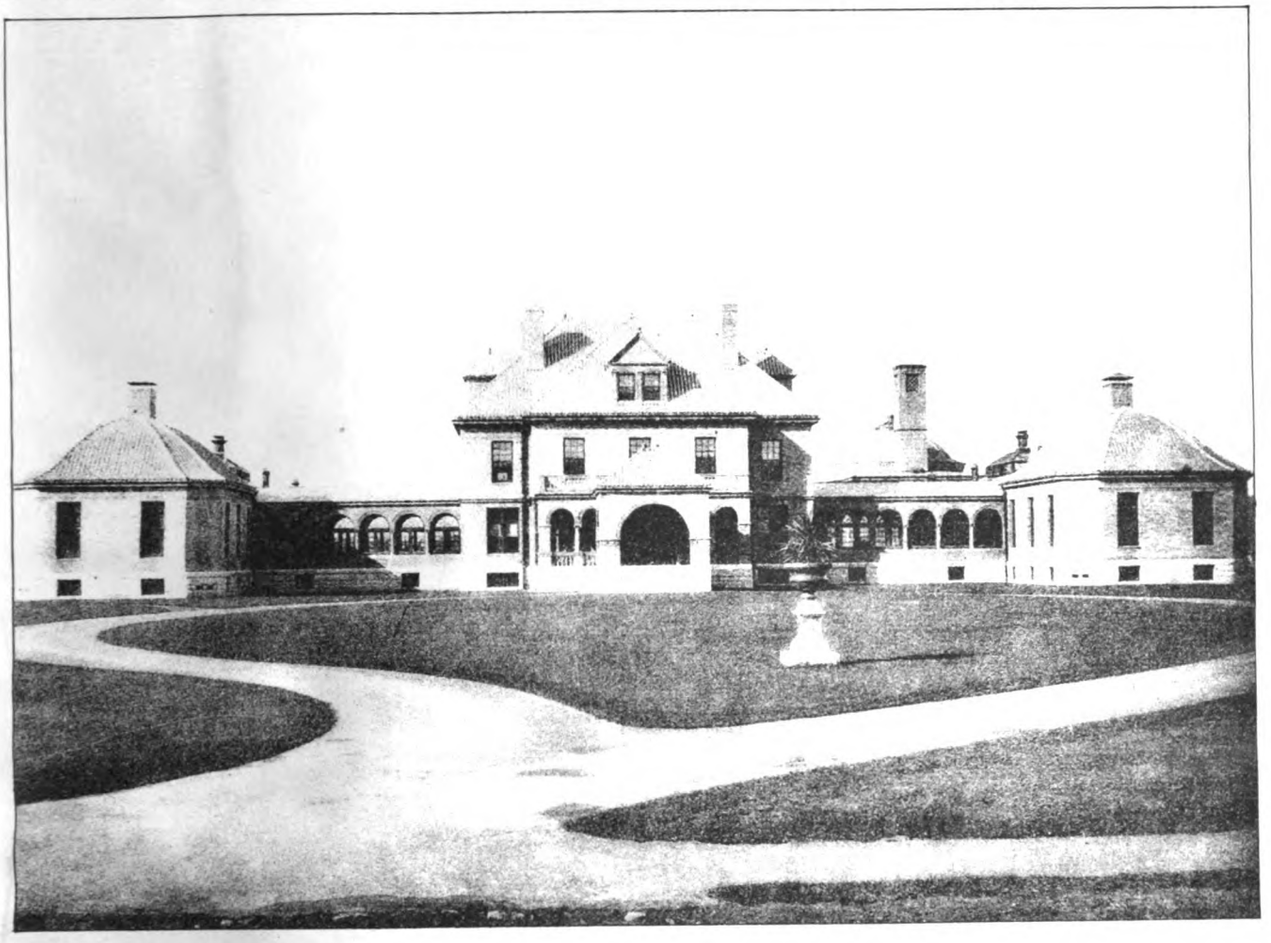


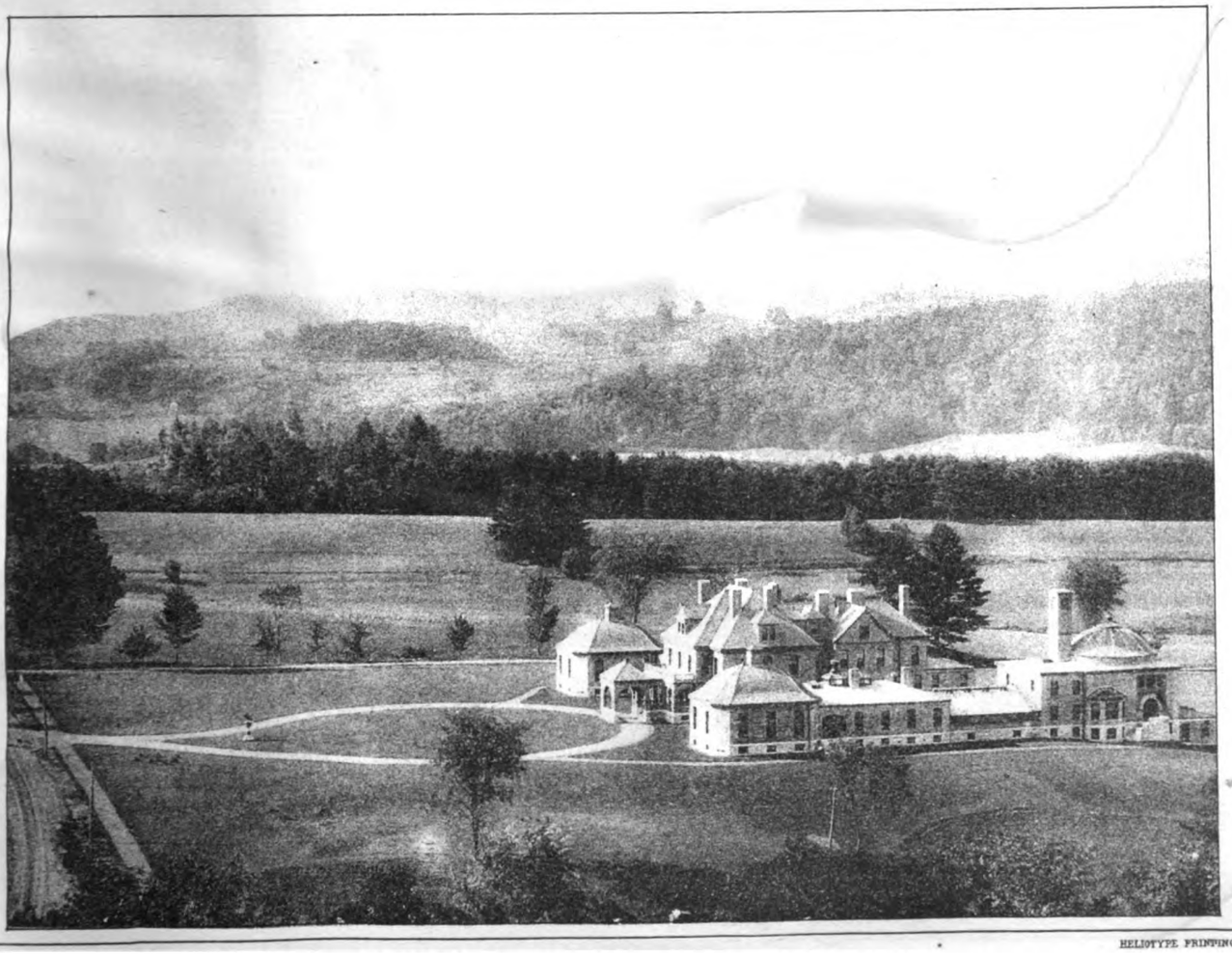
THE MARY HITCHCOCK MEMORI

RAND & TAYLO

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AL HOSPITAL, HANOVER, N. H.

R, Architects.

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St. Margaret's House, St. Luke's Church, Germantown, Pa.

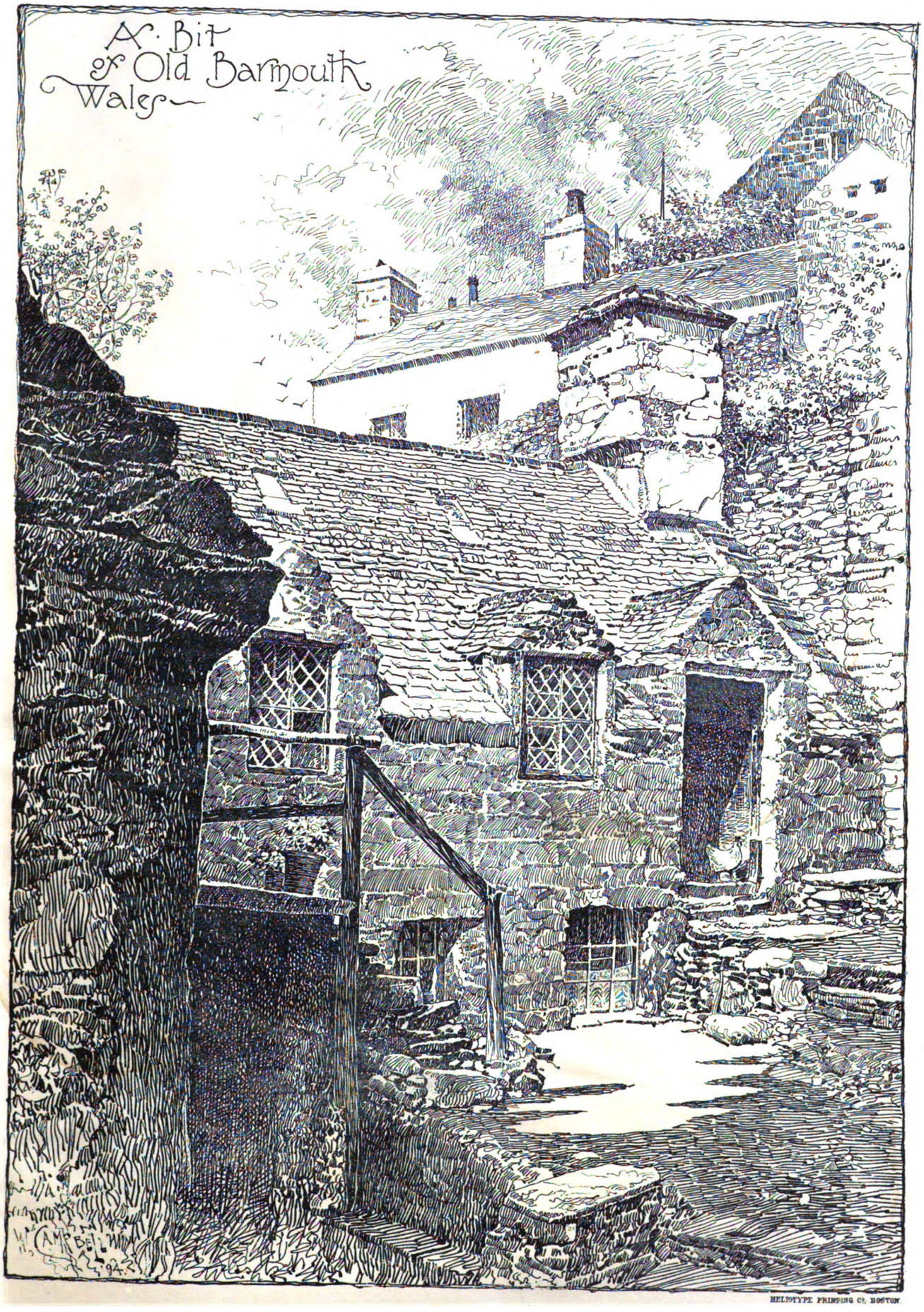
Geo. T. Pearson, Architect. Philadelphia.

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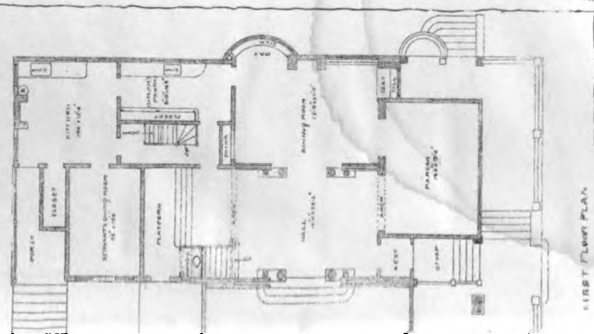
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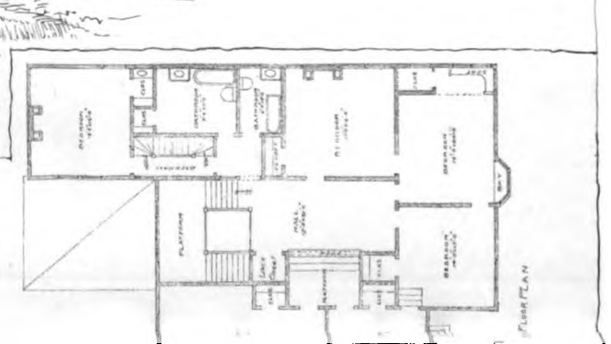
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Design for House at Lakewood N J.
E.G.W. Dietrich Arch.t



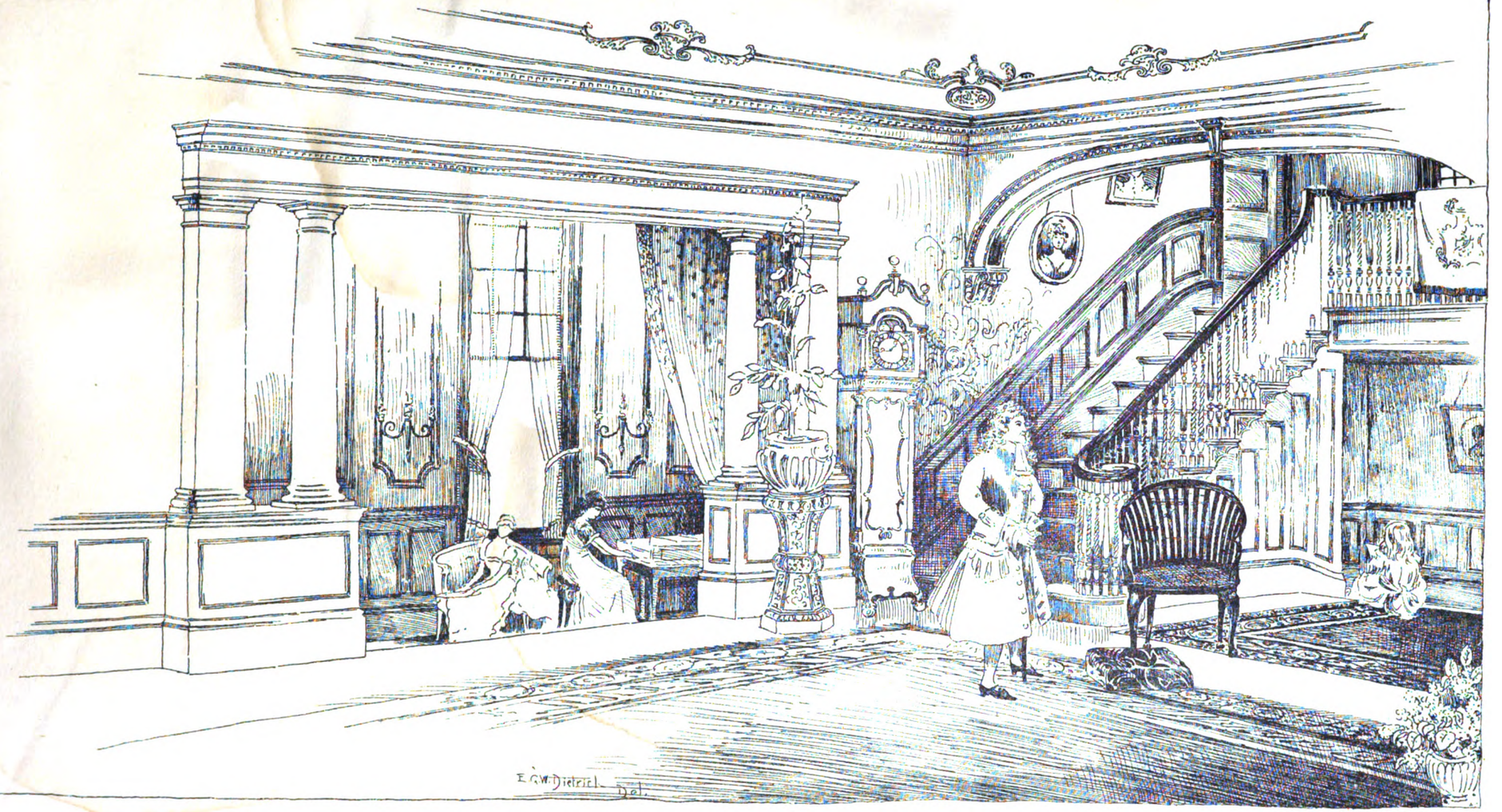




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Hall for House at Lakewood N.J.

E.G.W. DIETRICH: ARCHITECT: NEW YORK.



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AUGUST 17, 1895.

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THE *Boston Herald* gives an account of the first building-law enacted for the town of Boston, which is curious; and it is still more curious that a regulation which would have saved the people of the city probably hundreds of millions of dollars was allowed, after the Revolution, to fall into disuse, so that even now, while certain portions of the city are subjected to building regulations of absurd and cruel strictness, other portions, which will soon become centres of population, are abandoned to methods of construction which will make of them, for a century to come, a menace and danger to life and property. In November, 1683, after an extensive fire had occurred in the town, the General Court of the settlement was called together in special meeting, and voted that "This Court, being sensible of the great ruines in Boston by fire at sundry times, with hazard still of the same by reason of the joining and nearness of the buildings: For the prevention of damage and loss thereby in the future; do order and enact that henceforth no dwelling-house, warehouse, shop, barn, stable or any other housing shall be erected and set up in Boston except of stone or brick and covered with slate or tyle; on penalty of forfeiting one hundred pounds in money to the use of the said town for every house built otherwise, unless by allowance and liberty obtained from this Court from time to time." The simplicity and efficiency of this order are characteristic of the period at which it was passed. One of the most highly valued friends of this journal, whose knowledge of early Boston is perhaps as thorough as that of any person living, reminds us that in the latter part of the seventeenth century Boston was the greatest ship-building town in the world, and that the activity and enterprise of its inhabitants had already made it famous on both sides of the Atlantic. The people who then directed its affairs had no taste for commissions, and compromises, and log-rollings, and timid consultations with conflicting interests in matters of such importance. They passed such a general law as they thought fit, reserving for the people who did not wish the law to apply to them the right to present their individual cases for consideration by the authority that enacted the general laws. When this regulation was allowed to fall into disuse we do not know, but it seems not improbable that the paralysis of enterprise which, as Mr. Ernst says, followed the establishment of the Colonial regime in what had been previously almost an independent republic, led to neglect of the wholesome regulations of the earlier period. However that may be, it is certain that wooden buildings began again to be erected within the city limits before the Revolution, and that they continued to be built until within a very recent period; the first of the State building-laws of Massachusetts being hardly twenty-five years old. The consequence of this neglect is that the busiest part of Boston is infested with rotten wooden fire-traps, concealed in narrow alleys, or in the interior of blocks of brick or stone buildings, the destruction of which would probably follow a fire in the wooden hovel; and, as no building-law in this country has yet ventured to ordain the removal of existing structures, these centres of inflammation will probably continue to exist until they have mouldered into dust, or have fulfilled their destiny by bringing to ruin the fair and costly buildings around them.

THE Boston Manufacturers' Mutual Fire Insurance Company, which is often the first to investigate matters related to the art of building, publishes a circular of great interest, in which it says that it has always declined to undertake boiler insurance, but that, under a recent statute of Massachusetts, all users of boilers will be obliged to insure them in an authorized company, or to submit to a State inspection, which may be insisted upon at inconvenient times, and may possibly involve the injury of the boilers by the operations of incompetent inspectors. As mill-owners will not like either to run the risk of having their boilers spoiled, or blackmail levied on them, by political heelers, decked out as boiler-inspectors, or to be compelled to take out policies in a certain company, on the company's own terms, it has occurred to the Mutual Company, or rather, to Mr. Atkinson, its President, that it might be judicious to collect a body of information in regard to the construction, setting and use of steam-boilers, which would be useful to persons interested, and might form the basis for a rational system of insurance, similar to that which has revolutionized mill-insurance throughout New England, and, by cheapening the cost of manufactured goods, through the elimination of the greater part of the fire-losses incident to the business, which, of course, are added in the long run to the price of the goods, has saved the consumers of such goods many thousands, perhaps millions, of dollars. In England, a Steam Users' Association already exists, under the charge of a very distinguished engineer, with headquarters at Manchester. This Association insures boilers, and its investigations, as our readers know, have had great influence on the designing of steam-plants in England. With the rapid development of our manufactures, it is quite time that something of the kind should be established here, and Mr. Atkinson's plan is a very promising one.

HE proposes that the members of the Mutual Company over which he presides, together with any others interested in the matter, who are willing to pay the three dollars subscription required of all the participants, should, if they have any real knowledge of the best material for setting boilers, of the method of avoiding waste of heat in baking the ground underneath, of the prevention of smoke, the best construction of chimneys, and the best type of boiler for a given service, furnish such information on the subject as they can. Meanwhile, two experts are to investigate boilers and steam-making, one in Europe, and the other in this country, their inquiries to extend over a year. They will make occasional reports, which will serve, later, as a basis for general rules. These reports will be printed, without, however, disclosing the identity of the plant which may form the subject of a discussion, and the printed slips will be distributed among the subscribers. Of course, the work will only be undertaken if the subscriptions warrant it; but there should be no doubt of this, for the subject is one of immense importance to a great number of people. Many architects will, we are sure, be greatly interested in the results of the investigation. At present, every architect is called upon for advice in regard to steam-plants to be established in hotels, apartment-houses, stores and office-buildings. In many cases, the consumption of coal under boilers put in under his observation reaches several tons a day, and a saving of ten, or fifteen, or twenty-five per cent in coal is of great importance to the owners. As a rule, architects disclaim anything but the most general knowledge of steam-work, and would not undertake to give expert advice on the subject; but the ridiculous claims made to their clients by the drummers who represent various patent devices, and whose efforts to effect a sale would put Baron Munchausen to the blush, often call them out, in spite of themselves, in defence of the established principles of steam-production. Most of them

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would be glad to add to their store of knowledge on the subject, and it is certain that the reports, made under the auspices of Mr. Atkinson and his Company, would furnish as rational and well-considered information as it would be possible to obtain.

THE much discussed Columbian medal, after two years of preparation, is nearly ready for delivery to the exhibitors at the Chicago Exposition to whom it was awarded. It will be remembered that Mr. St. Gaudens was employed to design the medal, and that, although his design for one side was accepted, his device for the other was regarded as objectionable, and, after a somewhat acrimonious discussion, was rejected, the Chief Designer of the Mint being employed to make a substitute. Judging from the illustrations in the New York papers, the new design is morally irreproachable, although there may be two opinions as to its attractiveness in other respects. Mr. St. Gaudens's side shows the figure of Columbus, very cleverly arranged to fill the greater part of the circle, and requiring only a portion of another figure in the corner, and a few indications of spars and landscape in the background, to occupy the space completely; while Mr. Barber's side has a sort of inscribed plank across the middle, a big blazing torch, tied with ribbons at each side, a globe on top, an angel, holding a trumpet with one hand, and a wreath with the other, on one side of the globe, and another angel, with a tablet in one hand, and a pen in the other, on the other side. This angel is marking latitude lines on the globe with the pen, and with the other angel, who is blowing his trumpet at the same time that he holds the wreath out to view, presents a scene of enthusiastic industry which is rarely found depicted on medals, and is in delightful harmony with the occasion from which the medals originated. But this is not all. Underneath the plank may be seen the lower edges of the sails of a "caravel," ploughing its way westward over a row of waves, which are supported on a cross-bar. Under the cross-bar is a vacant space, the designer having apparently been unable to think of anything more to fill it with. As compared, however, with Mr. St. Gaudens's side, with its single figure and a piece of another, the richness of Mr. Barber's composition is so striking that we can readily pardon the hiatus which terminates the flow of imagery, and, indeed, as it is, it is wonderful how any one could have thought of so many things to put in. One piece of delicate courtesy, which should be particularly noticed, is the introduction of a slice of the caravel under the plank. This, we are told, was "to make a unity, or completeness of idea," "forming an allegory between the two sides of the medal." If it had not been for this, as will be readily seen, the public might have failed to grasp the connection between Columbus and the torches and angels around the plank on the other side; and St. Gaudens's figure would have been, as it were, left out in the cold; but now, through this thoughtful piece of politeness, people who have become satiated with admiring the industry of the angels, the symmetry of the torches, and the rectangularity of the plank, on seeing the pieces of caravel projecting from under the latter, will have Columbus brought to their minds, and, not seeing any representation of him among the angels and other things, will be led to turn the medal over in search of him; and thus attention will be called to a deserving effort of sculpture which might otherwise have been neglected.

LE MONDE MODERNE, the new French monthly magazine, contains in each issue a review of the past four weeks, by different writers, each of whom takes up a special manifestation of the progress of affairs. In a recent number, the reviewer of financial affairs makes what is to us a novel suggestion, in saying that the gradual reduction of the current rates of interest, which has been observed of late years all over the civilized world, so far from being, as superficial newspaper reporters call it, a sign of prosperity, and an indication that the world generally is making money and saving it, is really the result of the socialistic assaults on capital which have been so constant and persistent for the past twenty years. In the pursuit of the plans for transferring one man's savings to another man's pocket, against the will of the first man, which have engaged the attention of philosophers, altruists, socialists, anarchists, collectivists and legislators, for the last decade or two, to the exclusion of almost all other matters, so many devices have been set in operation to prevent manufacturers, or builders, or merchants, or carriers, from being able to count with certainty on the time when they can get anything done, or the amount that they will have to pay for getting it done, or the price that they will be allowed to charge for it, or the proportion of the price received that they will be allowed to keep, that few people, particularly among those with small capital, dare to venture their money in pursuits attended with so much uncertainty; and the great majority of prudent persons, instead of undertaking any business for themselves, prefer the comparative security of a salaried position in an establishment rich enough to withstand the risks of socialistic legislation, and try to get some return from their modest savings by investing them in the securities of corporations which they think rich enough, and powerful enough, to protect themselves against the assaults of a similar nature, but increased ferocity, which are made upon corporate property. The consequence is that business of all kinds, instead of being shared among a multitude of small capitalists, is left to concentrate itself in the hands of strong corporations or combinations, while the people who, under normal conditions, would use their savings in hiring people to help them carry on modest manufacturing or mercantile enterprises, are obliged, in order to invest them with any degree of security, to compete with each other for an interest in the powerful corporations which, as they have learned, can alone defend themselves against legislative oppression; and, while the number of unemployed workingmen tends every year to increase, the rate of interest which investors will accept is constantly reduced.

IN England, where legislators of both parties have grovelled for years before the preachers of socialistic despotism, and where no scheme for robbing prudent people of their savings is too crazy to find supporters, a great deal of money is said to have been lent this year at the rate of one and one-half per cent per annum, the lenders asking for nothing but perfect certainty that they will get their principal back in full, at the time agreed upon; at the same time that the workingmen, whose professed representatives and leaders preach without ceasing of their "victories over Capital," and of the time when everyone who has any money to spend shall be "forced" to pay for what he buys a price fixed by these dictators, wander hopelessly about, in search of the employment which their advocates have been chiefly instrumental in taking away from them. In France, where, although common-sense is perhaps more generally diffused than in England, the coquettings of the Government with the advocates of socialistic measures have been very conspicuous, the paralysis of the smaller industries is strikingly shown by the subscription to a loan issued a few weeks ago by the Crédit Foncier. The issue was of the kind called here a debenture loan, the security being notes due the Company, instead of property actually in its hands; and, as such, it would not be regarded here as an investment of the highest class; yet, although it bore only two and eight-tenths per cent interest, it was subscribed thirty-three times over, the simple name of the Crédit Foncier affording a guarantee of safe return of the money invested which seemed to the four hundred thousand modest capitalists who applied for a share in the loan of more value than a larger interest, with greater risk.

ARCHITECTS, and other persons interested in architecture, who happen to be in Boston, should not fail to make a visit to Trinity Church, and study the detail of the new porch, on which the carvers are busily at work. It is hardly necessary to say that the work is interesting, and, to the extent compatible with correctness of style, original; and this porch, which is thoroughly Romanesque in the variety and richness of its detail, has afforded a fine field for artistic expression. The opportunity has not been lost, and we do not know a piece of exterior architecture in this country of the same extent, which will hold the attention of a student for a longer time, and with more satisfaction. The staging, of course, affects for the present the lighting of the pretty little singing cherub heads which swarm in the cornices and gables, so that the necessary allowance must be made for all the circumstances; but even as it is, the richness and interest of the sculpture, the delicate profiling of the columns, contrasting with the deep shadows and the solidity of the massive stonework, produce an impression which, to our mind, cannot be obtained elsewhere on this side of the Atlantic. As to whether the alterations improve the original building, "that is another story."

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THEATRES.[1] — XVIII.

ZURICH THEATRE.

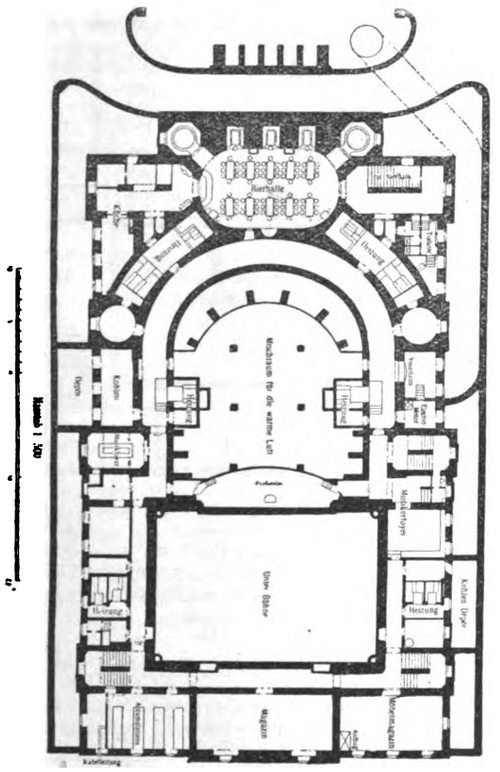
TO the *Schweizerische Bauzeitung* we are indebted for the illustrations and plans of the Zurich Theatre, and the notes descriptive of them are for the most part gathered from the same source.

Messrs. Fellner & Helmer are the architects of this important work, which is but one among a great number of theatres which this firm has erected within recent years in the various great cities of the European continent.

On New Year's night of 1890, the old Zurich Theatre was destroyed by fire at a time when the house was fairly full, but, fortunately, no lives were lost. The fire originated in the ladies' room of the foyer, but how it was caused is unknown. The whole of the wardrobe, the important library of the directors, the music, etc., were totally lost.

The committee raised a sum of 1,125,000 francs for the new theatre, and in addition to this, some 6,000 francs were subscribed for the working capital. Then came the question of the choice of site, which was eventually decided should be in Dufour Platze, and the design of Messrs. Fellner & Helmer, of Vienna, was selected for the new house.

It was decided to erect a theatre with as much simplicity of design as the important nature of the building would permit. The architects were, in consequence, somewhat hampered, and although the townsfolk of Zurich wanted otherwise, they had to carry out their front façade in freestone.



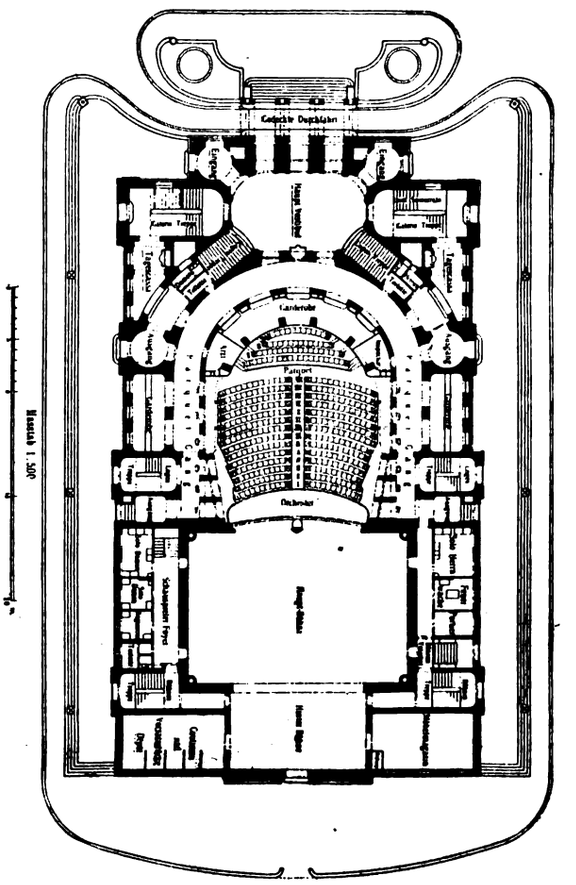
Difficulties in the foundations unexpectedly increased the cost of the building by 200,000 francs. The site consisted of a piece of land, which, partly for two centuries and partly within the last twenty years, has been reclaimed from the Zurich lake by filling-in, and from this fact it will be understood that the sub-soil made a most unsatisfactory and uncertain foundation, varying, as it did, in accordance with the nature of the materials which had been used for the filling-in of this portion of the lake. In order to secure a solid foundation, wooden piles were driven in below the made ground.

Up to November 22, 1890, the work was pushed forward with uninterrupted vigor; then began an unprecedented winter, such as the annals of the country have but rarely registered, for without cessation the frost lasted five whole months, resulting in the laying of the brickwork being frequently, and eventually entirely, stopped. The interior work was also greatly retarded, but in order to accomplish the task of opening the theatre in the autumn of 1891, the work was expedited in every way, regardless of cost. All the rooms were separately heated day and night for several months, and daylight was replaced by a provisional instalment of the electric light, so that the short day should not cause short working hours. The result of all these measures was that on December 31, 1890, appeared above the walls of the auditorium the branch of a fir-tree, decorated with colored ribbons, denoting, as is the custom in Zurich, that on that day the structure was ready to receive the roof.

Through the extra expenses already referred to, there was very little money on hand for the ornamentation of the main façade, with the group of figures and other sculpture so necessary to embellish public buildings of this class. The directors determined to invite a competition for the sculpture, but there was only a moderate sum to offer as a premium for the best design, and the time for preparation was very short, so no great demands could be made upon the competitors. The interest taken in the competition, however, was very gratifying, for models were sent in from France, Italy and Austria, as well as from Switzerland.

As witness that the architects have given attention to all the demands of a building for theatrical representations, there is provided as a separate building, a store-house for the scenery in the immediate neighborhood of the main building, by which means the overcrowding of the plan upon the limited area of the site was avoided.

For the lighting of the chief entrance, there are four corner electric arc-lamps, while two others light the way to the restaurant below the vestibule. The whole of the theatre is lighted by electric "glow-lamps," and their number in the foyers, staircases, auditorium, etc., is eight hundred, while an additional nine hundred serve to illuminate the stage and its surroundings. Four big "accumulator batteries" are provided for emergency in the event of anything going wrong with the electric-light machinery: if, therefore, during the play, one or even both of the engines were to break down, the light



would not be extinguished, as the accumulator-batteries would be at once brought into use. These batteries also play another important part over the whole of the building, that is, they supply the "emergency" lights, which are made to burn during the whole time the audience is in the theatre; these are on an entirely separate circuit from the permanent lights.

The ventilation of the house is effected by means of two ventilating-fans, one in the basement acting as the intake, the other in the roof as the extract. These ventilators have the power of renewing 45,000 cubic metres of air per hour; the air can be regulated in temperature according to circumstances. The whole system is worked by electric motors.

Electricity finds many further uses in this new theatre. In order to avoid the introduction of gas for any purposes whatever, owing to the dangers of fire and explosion connected therewith, even the hairdressers' curling-irons are heated by electricity, and the offices are warmed by electrical heating apparatus.

There is an extensive system of electric fire-alarms, signal arrangements and telephonic communications throughout the various parts of the interior of the building, as well as in the machinery-house, so that a message of alarm can be conveyed quickly with the greatest facility from any one part to any other of the whole theatre.

The exterior sculpture represents, on the chief façade, "Music" and "Poetry," the work having been executed by Vogl, of Vienna. The groups that crown the staircases depict the triumph of the histrionic and musical arts, while the gable of the back elevation is filled with a "Victory" and other figures.

[1] Continued from No. 1022, page 37.

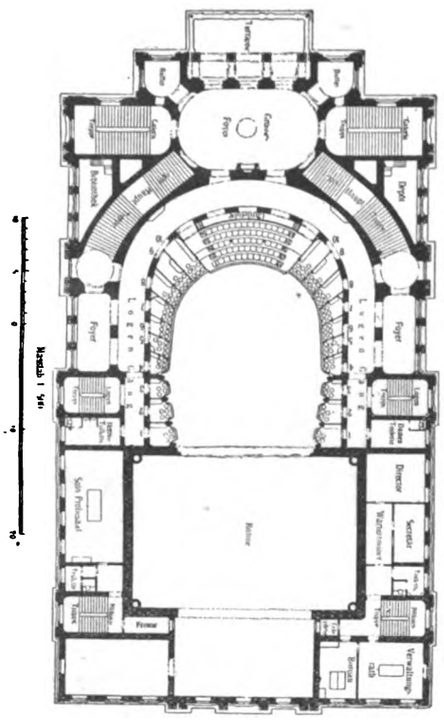
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In the window recesses of the foyer are busts of Schiller, Goethe, Lessing, Shakespeare, Mozart, Weber, also by Vogl, of Vienna.

The gardens which surround the building are laid out in terraces and add greatly to the beauty and dignity of the whole scheme.

There are five exit doorways in the front which are also entrances, and on both sides, to the right and to the left, are five other exits, including those from the stage, making for the theatre-goer and performers fifteen available ways out of the house. Three doors lead from the covered carriage-way into the chief vestibule and two at the sides for the pedestrians. The chief vestibule is oval in plan with arched roof. The color-treatment is white, with "flat" caryatides at the foot of the steps.

At both sides of the box-office, which is in the centre of the vestibule, are entrances to the stalls and parquet balcony. Leading in



a diagonal direction are the marble staircases, which are the entrances, right and left, to the grand tier, while at either end of the vestibule are the broad staircases, which form the approach to the gallery. The walls of the chief staircases are lined with marble.

Particular stress is laid upon the fact that all stairs and corridors as well as the auditorium have separate means of obtaining light and air, so that in case of danger absolute darkness is impossible, and even should such a thing occur as the failure of the emergency lights as well as two permanent systems of lighting, then the lights from the streets would be visible.

The theatre is divided by the proscenium-wall, with vestibule staircases, auditorium and managers' rooms on the one side, stage, dressing-rooms, etc., on the other. The spectators are placed as near to the street as possible, the exits being by easily-found stairs and passages, so that the open air can be reached in the shortest possible time, without any obstruction or hindrance.

A wide corrider runs around the back of the parquet on the ground-floor with ample cloak-room accommodation at the back and at the sides of the seats. The box staircases are near the proscenium, to the right and left.

The grand tier consists of ten private boxes on each side with a limited number of "balcony" seats in the centre. The grand foyer is on this level with two smaller foyers at the sides. There is a large gallery over the grand tier, the special features of this level being the open "terraces" on either side of the auditorium available as recreation ground in the summer and as immediate exit from the auditorium to the open air at all times.

To further describe the provisions for the public: it will be seen by the plans that the occupants of the stalls and grand tier arrive by the vestibule, and that the way up to the boxes and balcony seats is by the staircases already mentioned, which are 2 m. 10 c. wide. The box staircases next the proscenium are 1 m. 50 c. wide and form pass staircases to the various levels as well as special exits leading directly into the street. The gallery staircases are 2 m. 50 c. wide and the gallery foyer measures 13 m. long by 7m. wide and includes cloak-room and buffet. From the foyer four double doors lead to the seats. The average exit space is one door for each sixty persons.

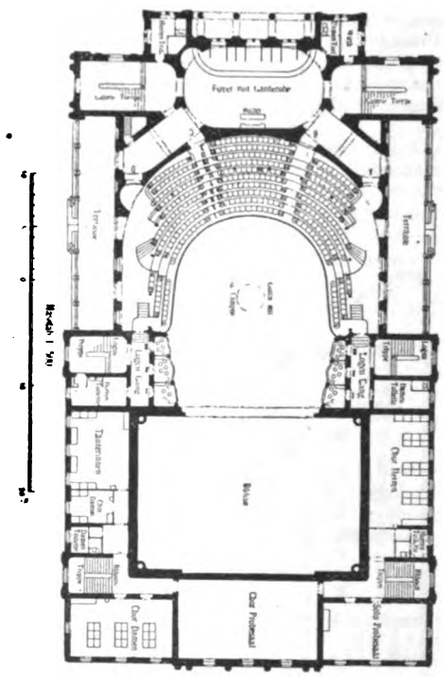
The whole of the decoration of the auditorium is executed in white and gold with a dark-red background.

The seating arrangements in the theatre afford special comfort, "standing room" is entirely done away with, and even in the cheapest places one finds comfortable "tip-up" chairs. All seats are numbered and it can never happen in a crush that more people are in the house than the architects have designed exits for; this is a great measure of safety and one that should be followed in all countries. The "sighting" is such that each person has a full view of the stage without hindrance from his neighbor.

The proscenium-opening measures 12 metres broad by 11 metres high, while the stage itself is 21 metres broad and 14 m. 5 c. deep, with a back stage of 13 m. 4 c. by 7 m. 5 c.

The stage is surrounded on three sides by passages dividing it from the dressing-rooms, rehearsal-rooms, etc. For the stage-hands there are stone staircases from basement to roof. The scenery door is in the south façade and it should be noted that the stage machinery is entirely of iron.

The basement of the building is used for the air-chambers, the



lighting and ventilating machinery, and the construction throughout is fireproof.

The fire-mains are laid on from the town water-supply and are adequately distributed about the building: they are 17 in number.

The following table shows the seating-accommodation of the theatre:

Parquet or stalls, 18 rows		407 seats.
Parquet balcony,	6 proscenium boxes	48 "
	8 boxes	46 "
	balcony seats, 4 rows	114 "
Grand tier,	6 proscenium boxes	36 "
	14 boxes	102 "
	balcony seats, 5 rows	69 "
Gallery,	6 proscenium boxes	34 "
	6 front rows	259 "
	4 back rows	123 "
	Total	1,238 seats.

E. A. E. Woodrow.

(To be continued.)

ST. LOUIS.

THE SEASON'S WORK. — THE CHEMICAL BUILDING AND THE CENTURY BUILDING. — NEW THEATRES. — TWO NOTABLE HOUSES. — THE NEW PUMPING-STATIONS. — THE ST. LOUIS COUNTRY CLUB.

SINCE the return of prosperity to the country, building in St. Louis has not assumed the enormous proportions which it at first promised. In fact, building operations are not any larger now than they were during the hard times. It must be remembered, though, that financial depression meant less as far as this city was concerned than perhaps in any other in the country. There was somewhat of a boom, especially in suburban property, during the prosperous years up to 1893, but the sales then were very little larger than those now made. The prices now prevailing are nearly

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the same as during the time referred to and were so during the depression. There was but one real-estate firm of any importance to go under, and their misfortunes were due to lending money and not to any real-estate transactions. In the early spring the number of building-permits was abnormally large, and many people naturally expected that that sort of thing would keep up during the summer season. However, we see many indications which point to great activity during the late summer and fall; although that period may seem unseasonable. But it is not so with large commercial structures, each of which give sufficient work to a number of men necessary for building several dozen of the small two-story dwellings or flats, which show up in such great numbers during their own season, in the early spring and summer. As far as real estate is concerned there has been a great deal of activity in St. Louis County of late, the inquiries and transfers being confined chiefly to the territory immediately contiguous to the city-limits of St. Louis. A very large electric-railway system is now being built and will eventually honeycomb the county. Most of the real-estate transactions are along the main stem of this system and its branches. The railway will connect all this territory through which it will pass with any part of the city and will undoubtedly prove the greatest benefit which the county has ever received. Previous to the hard times acre property ten and fifteen miles from the city was cut up into building lots and sold by the front foot. It was in many cases far from a railroad. This was not so much of a disadvantage, however, because of the inadequacy of the suburban train-service on the various lines leaving St. Louis, and thus it was of no advantage to be near the railroad. The new electric-railway system will, however, revolutionize matters. It is to parallel the two principal steam roads serving the best and most thickly populated suburbs. The steam-cars will undoubtedly lose nearly all the traffic, as has been the case not only in St. Louis under similar circumstances, but also in other large cities.

Two new sky-scraping structures are now in course of construction. One of them, the Chemical Building, by Mr. Henry Ives Cobb, of Chicago, is to be sixteen stories in height, a greater number than in any building in St. Louis. The design shows a very plain, but neat and substantial building in the Romanesque style. It will be surmounted by a roof-garden, which will practically form a seventeenth story. The estimated cost of the structure is $600,000, but an outlay of $1,000,000 will better represent the entire investment. The building is owned by the Chemical Building Co., and the entire ground floor will be occupied by the Chemical National Bank. The other structure referred to is the Century Building, which will be a more elaborate and costly undertaking than the one just mentioned. It will front on three streets, Locust Street, Olive Street and Ninth Street, being located just one block west of the Chemical Building, and across the street from the general post-office. The cost of the building alone will be in excess of $1,000,000. It is to be a combined theatre and office-building, the Chemical Building being for offices only. The structure is to be twelve stories in height, and built entirely of Georgia marble. The two upper stories are to be occupied by a secret society. It is supposed that it will require at least a year to complete the building in its entirety, but the theatre portion will be in readiness sometime during the winter. The theatre is to be first class in every particular. Perhaps there is no large city in the United States which is so badly in need of several first-class theatres as St. Louis. The Century Theatre will make a good beginning. Two other theatres are in course of erection, but they can hardly be called first class, that is if we gauge such by the class of attractions to be engaged and the people who will frequent them. A Jewish synagogue is now being converted into a theatre, to be called the "Oriental," and another is being built on Pine Street in the vicinity of Tenth Street, and will belong to the same category.

It certainly will be a relief to those who have ever seen the Fagin Building to hear that the hideous thing is to be demolished and a handsome structure that does not break all laws of architectural beauty erected in its stead. The building was erected about ten years ago at a cost of, perhaps, $175,000. This is a large amount of money, but certainly not sufficient for erecting a ten-story office-building on one of the most prominent retail thoroughfares in a large city. The building is not fireproof. It is not even on the slow-combustion plan, and what makes us wonder more than all is that the Building Commissioners should ever have granted a permit for the erection of such a fire-trap. Everything about the entire structure looks cheap, and if ever a building could be called an "architectural aberration," the one in question certainly can. There are but three outside walls, one on each side and one in the rear. The front of the building is separated into five equal parts by dividing walls running back to the rear and the five spaces are filled-in with metal-work, embracing large plate-glass windows. The ends of the dividing walls as they jut out at the façade of the structure present a most crude appearance, being made up of rough granite blocks, polished columns without capitals or bases, and polished granite spheres, stacked up and arranged in utter confusion, beginning at the ground and reaching to the roof. At the latter there is a great deal of metal cornice and metal-work shaped and painted to match the granite below. The interior woodwork is decorated in the most unique and fearful manner. The wood is yellow-pine oiled, and put on it by some method unknown to us are black walnut moons, stars, hemispheres, and other such excrescenses. The building was not rented for many months, because people were really afraid that it would collapse. At last one lone tenant appeared and was bold enough to display a sign. For a time he was noted for his bravery and the sign for its uniqueness. Then a second tenant moved in, others following. Most of the offices are rented at present and all the stores, but we doubt very much the success of the undertaking. The building will be torn down and a $300,000 structure erected in its stead.

Two fine houses are now being built in Westmoreland Place, which with Portland Place adjoining is considered the most desirable high-class residence property in St. Louis. One of these near the east gate and belonging to Mr. Van Blarcom is among the most successful houses, from several points-of-view, which has been erected in St. Louis for some time. It is supposed to be in the Colonial style, but the main part of it is built entirely of dark limestone and is so massive and palatial looking that it could be more properly called sombre Italian Renaissance. It lacks the domesticity which belongs to the Colonial style, although there is certain detail-work commonly to be seen in examples of that style. The structure would look very much like the Farnese Palace in Rome if the pilasters were eliminated. There are three pairs of these running from the second story to the frieze below the cornice, and apparently dividing the façade into unequal portions so far as the two upper stories are concerned, the middle one being about twice the width of each of the two side ones. The stonework of the two upper stories present a smooth-cut and plane surface, while that of the first story has wide incised joints. The rear wing of the house, containing kitchen, pantries, servants' quarters, etc., is in dark brownish-gray brick with trimmings of the same kind of stone of which the main portion of the structure is built. This wing is pure Colonial, and the stable matches it as far as materials and style are concerned. The style appears to better advantage in these two unimportant parts of the structure than in the main building, as stone when used alone certainly lends too much coldness and dignity to Colonial architecture. It is essentially a domestic style, and it is not as applicable to the palatial residence as it is to the more humble and less pretentious house.

The house of Mr. Byron Nugent, about the centre of Westmoreland Place, is the work of Mr. W. Albert Swasey. In many respects it is one of the handsomest houses in the city. It is built entirely of pure white St. Louis limestone, which at a distance has the appearance of white marble, and the style is Romanesque. The house is two and one-half stories in height and is surmounted by a moderately high roof laid with red Spanish tiles which contrast beautifully with the stone of the building. The stonework at the base of the house is smooth-cut, unpolished, red Missouri granite. There are two bays at the front of the house and one on the side to the right, all similarly treated, and reaching from the ground-level to the top story. The stonework of the entire first story, including the bays, has wide joints and is cut in, showing the rough-cut individual stones. This is true only so far as the façade, that portion of the right side of the house including the side bay, and the left side of the house are concerned, the rest of the right side and the rear being finished merely in smooth-cut stone. The key-stones of the three windows in the first story of each bay are carved lions' heads, rich in appearance. Above the windows is a frieze of richly carved work, conventional in design.

The same fault is to be found with this carved work as with some other very similar in design on a certain house on Portland Place adjoining. It is entirely too large and heavy for the building. It would be very much more in place on a large public building. The rear of the house is plain cut stone. This is another example of over-ornamentation on the front of a house and too severe plainness in the rear. It is a positive breach of good architecture not to make the rear of a house as beautiful in its own way as the front. In the case of this building, the ornamentation stops abruptly at a certain point and the plain stone finish begins. A little less ornament in the front and a little more in the rear would have been in better taste, or if money is no consideration, the continuation of the front ornamentation around the entire structure. In the centre of the rear is a tall copper bay following the course of the main interior staircase and this copper is decidedly out of place. No other material than the stone of which the house is built should have been used for this purpose. As far as the interior of the house is concerned, the ceilings are very low, the rooms very small, and the hall leading to the *porte-cochère* entrance very narrow. These deficiences are very disappointing in consideration of the large and pretentious appearance of the exterior of the structure. This is a prevalent fault in some of the finer residences erected in St. Louis lately. Italian Renaissance is above all other styles adapted to large and spacious apartments, with broad and sweeping hallways. The mere fact that columns form such an integral part of its makeup, in our mind, associates spaciousness and grandeur with the style.

The Chain of Rocks Station of the St. Louis water-works system, known as Station No. 2, is now in complete working-order. The final tests of the great pumps previous to their acceptance from the builders by the City were made several months ago. Station No. 1 at Bissel's Point, which was previously the main plant and not only pumped water directly from the Mississippi River but also distributed it over the entire city, is now to be used only for distribution purposes. The Chain of Rocks Station will pump directly from the river, and the water will be delivered to the station at Bissel's Point *via* a gravity conduit five miles in length. The capacity of the Bissel's Point Station is, however, not sufficient for distributing

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water to all portions of the city, notably the new West End and Northwest St. Louis. These will be supplied by a second distributing plant at Baden, which is the northern end of St. Louis, to be known as the Baden Station, or Station No. 3. It lies between the Chain of Rocks and Bissel's Point Stations on the line of the conduit. A gate-house is located over the latter at Baden equipped with water-gates to divert the water to the two settling-basins to be built shortly, whence it will be distributed by the pumps throughout the territory to be supplied by the station. The foundations for the pumping engines are now in course of erection, and are fine specimens of the mason's art. There are to be two pumps. The stone for the foundations is brought from the Grafton quarries, at Grafton, Ill., and is somewhat mottled in color, though a yellow tinge prevails. The arches are of what appears to be white St. Louis limestone. Granite is also to be used in the construction of the foundations. The two settling-basins will be built on the site very shortly. They will be used for settling the water before it is distributed. Together with the four basins at Bissel's Point distributing-plant they will equal in number and capacity those at the Chain of Rocks Station. The Chain of Rocks Station is capable of pumping 160,000,000 gallons from the river every twenty-four hours, and the Bissel's Point and Baden Stations are capable of distributing this amount in the same period of time. The full capacity is sufficient to supply a city of about 1,500,000 inhabitants, so it will be amply sufficient to supply all needs for some years to come.

The building and grounds of the St. Louis Country Club are now approaching completion. The site is located in St. Louis County, about one mile west of the city limits on very high ground overlooking the surrounding country for several miles in every direction. The best view is towards the south, and the building has very wisely been made to face in that direction. The elevation of the site was so high that the ground in front of the Club-house had to be filled in to a great extent in order to provide a level polo-ground, as it was rightly decided that there the polo-ground should be located. The Club-house is the work of Messrs. Shepley, Rutan & Coolidge, of Boston, Mass., who have a local representative. There was a very spirited competition for the prize, and, with no desire to take sides with any particular architect, or firm of architects, we think that the Club members chose the poorer of the two plans which were worth consideration. Several plans and elevations of the building were shown at the exhibition of the local Chapter of the American Institute of Architects last winter, and we think we outlined the above opinion in criticizing the exhibition. In our opinion Mr. Manny's plan was far more successful than the accepted one. The building is in the Colonial style and of frame construction throughout. The main entrance is graced with tall columns which support the extension of the roof and thus stand out from the building, about ten feet or thereabouts. On the opposite side of the house is the *porte cochère* also consisting of tall columns supporting the extended roof, and corresponding to the entrance just described. Were it not that one-story porches extend in opposite directions from the pillared entrance the latter would have a most pleasing effect on the façade of the building with its long sweep. The porches are positive nightmares and have nothing whatever to say to the rest of the building, it being utterly impossible to harmonize them with the tall columns which they hem in on each side. The interior arrangement is very good so far as the first story is concerned. There are no windows, glass doorways which open onto the porches taking their place. The sleeping-rooms above in the second story and the hallways are very small in the one case and narrow in the other, but with plenty of openings will doubtless prove to be cool and airy during the season when the Club will be patronized. Several members intend erecting summer cottages about the Club-house, which are to be of the same style and finish as the latter.

RICHARD M. HUNT.

AS we doubt whether any one is likely to succeed in producing a better characterization of the vivid personality of Richard M. Hunt than has a writer in the New York *Tribune*, we are very glad to place it before our readers, regretting only that another portion of his notice which relates to Hunt's architectural work is not conceived in so happy a vein:

"Architecture in America, like painting here and everywhere else, has had certain masters to whom the rank and file have looked for inspiration. For a long time, and that the most crucial period in the artistic history of the country, the personal supremacy was divided between two men — Henry Hobson Richardson and Richard Morris Hunt. The former did his life work in Massachusetts. He built Trinity Church, in Boston, and set an example which scores of young architects tried to follow and by which they profited, even when they preferred not to emulate it closely. He imposed the impulses of his individuality upon a following so large that it promised to form itself into a school. Then it faded, so that now it scarcely exists at all; faded, not because Richardson's style was a bad style — on the contrary, it was superb — but because it was essentially personal, essentially the expression of a specific strain of genius and could not therefore be perpetuated by its imitators. Hunt abandoned the personal bias at the outset of his career. He was, from first to last, an academic artist, rich in character, in strength of temperament, but scholastic to the core. The difference between these two most conspicuous figures in American architecture is inevitably noted as the career of either of them is approached. To any one who has studied the progress of architecture in this country it has been fascinating to watch the two influences working side by side, and to see in the longer survival of that with which we are now concerned another proof of the cosmopolitan, eclectic nature of American architecture, its refusal to bow to a personal style and its steady return to the abstract principles which a man like Hunt was pre-eminently qualified to teach. Hunt did teach his countrymen. He did not make them mould their styles on his. But he drilled them in the logic of architecture, in its rectitude, in those elements of it which are independent of temperament. It is in that light that he appears, now that his career has been ended, as one of the most remarkable artists of his time.

"As a man, Richard Hunt was the antithesis of his architectural self. He was a picturesque figure, stalwart for his inches (he was not a tall man), and with something in his carriage as well as in his manner of speech that made you suspect the military officer rather than the artist. His head was handsome; it conveyed even an impression of stateliness at times, under the gray hair. But the air of stateliness was fleeting. In the main, Hunt was extraordinarily vivacious, almost a Frenchman in some of his quick passages of talk, and the talk itself was explosive. He liked pungency and never failed to introduce it into his discourse, no matter what the occasion. At a public dinner, no less than in private conversation, he was fond of accentuating what he had to say with something of that tempestuous rhetoric in which old Mr. Hardcastle was wont to indulge, and yet there was no depth of wrath in Hunt's fiery speech. If he damned a thing, he did it genially and with a touch of humor that somehow made the seeming indignity almost a form of approval. He would grow apocalyptic sometimes, piling up his denunciations in heroic masses; but all the time there was the twinkle in the eye that prepared you for the harmless conclusion, and it was usually odds that you would burst into laughter with the crash of the wordy climax. And Mr. Hunt laughed with you. He was helpful and sympathetic by nature. To the veriest stranger he was accessible and cordial so soon as he saw that his interlocutor was seriously interested in the question at issue. For in the great question for him, in the question of architecture, his interest was profound and inexhaustible. There you come back to his art, to the professional side of his career.

"As a man, Hunt was impulsive, quick-tempered, ebullient, picturesque always. As an architect, he was an unflagging enthusiast, fighting always for what he believed to be the best, and inspiring the same ardor in all those with whom he came in contact. There was nothing hasty or ill-considered on his architectural side. The study which had engrossed his life was begun when he was only fifteen. At that age he left Boston, where he had been studying in the High School and the Latin School, and went with his mother to Europe. She took him to Geneva, where in 1843 he entered the architectural atelier of Samuel Darier. From Geneva he proceeded to Paris and continued his studies. Hector Lefuel was his master. He studied at the École des Beaux-Arts for some time, and then went off to Egypt and Asia Minor. He came back to Paris in 1854 and was made Inspecteur des Travaux by the Government, the appointment directing his energies upon the construction of those new buildings which connect the Tuileries with the Louvre. Lefuel was in charge of this work and he gave Hunt the Pavillon de la Bibliothèque for his province. It meant precious experience to him. It was a practical training in exactly the school which pleased him most — the French school of academic architecture, the school of a style which takes splendor, dignity and a certain monumental feeling as the most necessary merits of its constructions. When Hunt was engaged upon this work he was still in his twenties. In fact, he was only twenty-seven when he returned to America with a foreign experience behind him that is probably unique in the annals of American architecture. His powers were soon recognized. He had scarcely settled here before he was invited to share in the completion of the Capitol at Washington. He served for six months as assistant to Thomas U. Walter, the architect in charge, and then he returned to New York and founded the practice which he carried on to the day of his death, only a few days ago. He established himself also as the master of an office — it would be called a studio in Paris — to which the young architects of the country were eager to gain admittance. It was at this time that his influence was perhaps most definite and potent. He drew any number of clever men to his side and, while no one of the group copied his style, they were all immensely benefited by the sound principles that he taught. Those principles were that architecture to be good must be good in construction, that every factor in a design must be in its proper place; that you must be, above all things, moderate, respectful of well-ascertained rules, true to that golden mean of taste which is the distinguishing mark of the school from which he came. A building with him was a problem to be solved with strict reference to the necessities of the situation, and with even stricter reference to laws of proportion, of balance. In a word, he was healthily academic. His genius was not creative and he did not strike out on new lines, but he was brimming over with vitality; there was nothing crassly conservative about him, and he kept his work within almost severe bounds without ever making it barren or coldly conventional." . . . . "His work is from first to last a demonstration of the value of authority, of the virtue of careful training, of the absolute necessity of some academic principles on which a work of art can be based with consistency and yet with the flexibility of nature."

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THE STYLE FOR A NEW CATHEDRAL.

IF the Liverpool Cathedral is in abeyance for the present, and the Birmingham one postponed, perhaps, to better times, there are two of which something is now being heard. The first is the Catholic one at Westminster, the other is presumably Anglican, and is in contemplation at Washington. What seems to interest the public, in each of them, is its style — style is about as far as the public usually get, in their attempts to judge of a new building. Few people, indeed, can be brought to see that there is anything beyond it. Plan, proportion, composition, detail, do not force themselves on the notice of the uninstructed; but even the man who reads nothing but newspapers and novels can see a difference, say, between St. Paul's and Westminster Abbey. It is like the difference between a Greek book and an English one, which would have been plain even to the little boy who, as he said, knew his letters very well, but had not learned the names of them yet. Such a little boy, as to architectural matters, it usually is who employs and directs and criticizes the architects of the day. Possibly it is a set of such boys — of all ages — who are the trustees of the proposed Washington Cathedral, and who have asked an architect, Mr. Flagg, to report to them on the subject of style. His statement in reply contains, as is natural under the circumstances, some rather elementary teaching, and in addition to this some very questionable assertions.

That Gothic architecture began to be copied in the United States about fifty years ago, and that it never has been copied there with any great success, are the undoubted facts which Mr. Flagg sets out. And when he goes on to trace the original development of Pointed art, he only says what has been said a great many times before. It amounts to this: "The olden builders wanted to make their churches fireproof. To do so, they vaulted them in brick or stone. They could not vault them unless the spans were narrow and the supporting columns numerous, and out of their structural incompetence in these respects arose all the peculiarities of mediæval churches. We can now do our fireproofing in easier and cheaper ways; therefore, let us give up Gothic, and" — here comes an extraordinary *non sequitur* — "let us build in Renaissance."

Now, first of all, we question the assertion that it was simply, or even chiefly, to make their churches fireproof that the ancient masons vaulted them. Vaulted and domed buildings had been in use a thousand years earlier than the Gothic period. Without going back to the corbelled stone coverings of early Greek treasuries, vast Roman works had been executed — not in Italy alone — without any structural timberwork in them. Every pilgrim to Rome saw the Pantheon and the remains of even mightier things; every Crusader who passed by Constantinople gazed on St. Sophia. Before Gothic arose, the Saracens were building their domed and vaulted mosques; the Greek Christians, their domed and vaulted churches. Men had for ages felt it to be a condition of the highest type of architecture that it should be roofed in the same materials with which it was walled. Nothing else is so masterly; nothing else is so permanent; nothing else is so monumental. Any tyro can cover his spans with wooden trusses, or with iron ribs, now they are in the market. That shows no skill, no power, no art. But it takes more than a tyro to build the smallest bit of vaulting; and the production of a vaulted building was the criterion of an architect.

This had never been quite forgotten. But constructional science had more and more died out from the eighth to the tenth century. There was a general belief that the world would end in the year 1000, and people felt, therefore, that it did not matter how badly all secular work was done. Probably they got into the state of mind which was attributed to a certain D. D. who flourished some 30 years ago, and who predicted that the earth would be swept away by a comet at a date now long since past. A fortnight before the time named, it was announced that the reverend gentleman was having his coals in by the scuttle, which was probably an exaggeration, though he belonged to a race noted for prudence and economy. The tenth-century people, however, did build, even if they did not live, in this hand-to-mouth fashion. They began the century with the conviction that the universe itself had only a 99 years' lease, and they did not attempt to make their churches more durable than the globe on which they stood. Craftsmanship was almost forgotten, and had to be revived out of barbarous ignorance when the scare was over. But one thing lasted through it — the habit of building on the basilican plan. When men took heart again, found that life had still to be lived, and learned once more, by slow degrees, how to live it, it was to the old long-aisled type of plan that their efforts at improvement were directed. It did not get its narrow avenues and its multitude of columns from the necessities of groined vaulting: they existed twenty generations before groined vaulting arose. They belonged to the type on which the churches of Western Europe were mainly based from the beginning — that is, to the Roman basilica.

What happened in the twelfth century was not chiefly a fright about fires, and a wild desire for fireproofing. Perhaps, indeed, the architects of those days, like those of our own, finding that their clients had more respect for "practical" than for artistic considerations, used the practical ones to influence them, when all the while it was the artistic ones that influenced themselves. Perhaps they said, and said truly, if your church is vaulted everywhere, it cannot be burned down like that in such and such a city, or at such and such an abbey. But what they were themselves thinking of was apparently more like this: "Christianity has become the greatest power in Europe; its buildings should be the most imposing, permanent and striking. We are outmatching the secular castles with our church-towers; we will surpass the old temples with our church interiors. The best that man can do in building is what we will do; and this best, as all nations know, is to span them, as well as to wall them, with stone." Does anybody to this day, know a better "best"? How long will the "fireproof" buildings last, which, Mr. Flagg says, can be erected "for a tithe of the time, labor and trouble" of the old Gothic ones? Their permanence, happily, is not likely to be much in excess of their beauty. If they do not burn down, as so-called "fireproof" buildings are notoriously apt to do, they will perish through rust, or crack themselves to pieces by the unequal expansion and contraction of their materials. There will be "many dry eyes" when they finally crumble away.

But how does all this praise of modern fireproofing show the superiority of the Renaissance style? The great Renaissance churches, which succeeded the Gothic ones, were, like them, spanned with stone, and not covered in on Puff's Patent Fire-Defying System. If the Gothic naves were spanned by cross-vaults, the Renaissance ones also were spanned with cross-vaults, barrel-vaults, and domes. In construction, they were vastly heavier than their predecessors. If, as Mr. Flagg supposes, Gothic churches were obliged to have so many columns because they were vaulted — Renaissance ones would have had a great many more, for their columns had a far heavier load to carry. But the fact is, that Gothic churches could easily have been built with much wider naves, and much fewer columns than we generally find in them. More than this — a great many of them were so built. St. Bertrand de Comminges was nearly 50 ft. across the nave, and had no aisles. The cathedral of Alby is 63 ft. across, from centre to centre of the piers. Tarragona Cathedral nave is only 52 ft. across from centre to centre, the Collegiata at Manresa is nearly 60 ft., and Palma Cathedral more than 60 ft., and the width of the bays, or, in other words, the fewness of the columns, in some Gothic churches is equally remarkable. At the Jacobins, Toulouse, the nave piers longitudinally are 30 ft. from centre to centre. At St. Antholin, Medina, they are at the same distance. At the "New" cathedral of Salamanca they are 33 ft., at Avila Cathedral 34 ft., at the Collegiata of Manresa 32 ft., and at Siguenza Cathedral 39 ft. What has been done so often could be done again, so that Mr. Flagg's "practical" reasons against Gothic clearly will not bear looking into.

He has a real reason, however, in the fact that Gothic has not been taken up with much success in America. But has Renaissance been followed there any more successfully? It hardly seems so, from the plans and views which find their way to Europe. The most interesting things in them are the American ones: the ideas, sometimes barbarous, sometimes incongruous, but sometimes fresh and suggestive, which our fellow-workers on the other side of the Atlantic have infused into that collection of odds and ends, which, under the name Renaissance, is just now in fashion. Yet, somehow the style does not seem so pliable in their hands as the Romanesque which they previously began to develop. In that they often took a line of their own, and did something at once natural and artistic. In Renaissance, their power to do that seems enfeebled. Most of it, apparently, is the same sort of thing of which we are getting sick in London: a mere product of caprice, without reason, without aim, without soul. We shall be rid of it soon, as probably they will, likewise: it would be a pity to begin a cathedral in a style which everybody will have seen through and despised before the walls are up to the level of the roof.

In Mr. Flagg's remarks on types of planning we observe with more pleasure an echo of much that has appeared in the *Building News* during the last quarter of a century. But plan and style are quite independent things. Unobstructed areas may be found in ancient Byzantine, Romanesque and Gothic buildings, as well as in Renaissance ones. The dome itself was incorporated into one variety of the Pointed style which flourished late in the twelfth century in Central and Southern France. It was adopted with equal success in the refined Romanesque of Spain: for instance, at Salamanca, at Zamora and, probably, at Toro. We have precedents for all we can want if anybody is still foolish enough to look on precedents as something sacred. To the wise architect they are far enough from sacred, though they are in the highest degree valuable. They are, in fact, somebody else's experiments tested by time and change, so that we can now see easily where they were weak and where they were strong, where they succeeded and where they failed. The Renaissance style, like others, has precedents for us of this sort — works to study, to criticize, to improve on. We hope it is frankly in this spirit that the Renaissance, which seems to have been decided on for the Washington Cathedral will be treated. Unless it is so, it would have been far better to leave the question of style an open one. — *Building News.*



SOCIETY OF BEAUX-ARTS ARCHITECTS.

A SPECIAL meeting of the Society was held on August 13, at 45 Broadway, New York City, at which a committee of three was appointed to draught Resolutions referring to the death of Mr. Richard M. Hunt, who was a member of the Society at the time

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of his decease, the resolutions to be engrossed and sent to Mrs. Hunt.

It was also *Voted*, To empower the President to confer with the President of the American Institute of Architects, the New York Architectural League, the New York Chapter of the American Institute of Architects, the Municipal Art Society and any other kindred societies of which Mr. Hunt was a member at the time of his death, with the object of forming a committee to consider the possibility of erecting or otherwise providing a suitable memorial to Mr. Hunt.

Edgar A. Josselyn, *Secretary.*

Illustrations

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE LOGGIA: METROPOLITAN CLUB-HOUSE, WASHINGTON, D. C. MR. W. A. POTTER, ARCHITECT, NEW YORK, N. Y.

[Heliochrome issued with the International and Imperial Editions only.]

ELEVATION AND PLANS: METROPOLITAN CLUB-HOUSE, WASHINGTON, D. C. MESSRS. GRAY & PAGE, WASHINGTON, D. C., AND MR. W. A. POTTER, NEW YORK, N. Y., ARCHITECTS.

HOUSE FOR MR. H. J. CHAPIN, ESQ., MONTCLAIR, N. J. MR. F. COLBURN, ARCHITECT, MORRISTOWN, N. J.

The cost of this building, complete, was about $12,000.

THE MONADNOCK APARTMENT-HOUSE, DORCHESTER, MASS. DWIGHT & CHANDLER, ARCHITECTS, BOSTON, MASS.

THE STADT THEATRE, ZURICH, SWITZERLAND.

For description see article elsewhere in this issue.

[Additional Illustrations in the International Edition.]

METROPOLITAN CLUB-HOUSE, WASHINGTON, D. C. MESSRS. GRAY & PAGE, WASHINGTON, D. C., AND MR. W. A. POTTER, NEW YORK, N. Y., ARCHITECTS.

[Gelatine Print.]

DINING-ROOM OF THE SAME.

[Gelatine Print.]

CARD-ROOM OF THE SAME.

[Gelatine Print.]

LIBRARY OF THE SAME.

[Gelatine Print.]

PROPOSED COMMERCIAL PROPERTY, PRESTON, ENG. MESSRS. ESSEX, NICOL & GOODMAN, ARCHITECTS.

This design was selected in a competition in which twenty designs were submitted.

ARCADE OF THE SAME STRUCTURE.

Communications

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A TRIBUTE TO HUNT.

27 East Twentieth St., New York, Aug. 12, 1895.

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly allow me through the columns of your paper an opportunity to offer my tribute to the memory of Richard M. Hunt?

Seven of the most important years of my life were passed in his office, working mostly under his eye, where I learned to know him as a kind-hearted, generous, broad-minded man, endowed by nature and education with many gifts.

His personal magnetism was irresistible, his methods were generous and broad-minded. He was too great a man to refuse the suggestions of the men in his employ; in fact, he asked for them, and frequently called for a council of war with them, requesting opinions and criticisms, which, when offered as they were, freely and without hesitation, were always considered, and frequently followed. Without exception he was respected and loved by his assistants; we were proud of him, proud of our connection with him, and proud of him in public.

He had strong characteristic business methods, was thoughtful and honest in his treatment of us, and in return invited frankness and honesty from us, hating deceit and trickery; an honest confession when in fault, either in office-work or in the personal carrying out of his orders, was always received by him as between man and man.

It was a treat and a pleasure to travel with him: I have spent a week in his company, away from the routine of office-work, when he drew from the rich fund of his experiences, brightening the journey by his strong, interesting discussion on architecture, treated in his own peculiar and never-to-be-forgotten manner, and enlivened us by anecdotes of his early days while travelling in Europe and the East, and during his stay in Paris.

I have seen many instances of his kind and generous nature, one when, with the fear of death on me, I handed him a telegram which called me to Boston, to the bedside of my little boy, whom I never expected to see alive; he encouraged and cheered me by his thoughtful kindness, more like a father than an employer. The thoughts of his kindness were with me for many a day and will never be forgotten. I have seen him in his private office, busy with an accumulation of letters, stop and greet a recently landed German draughtsman in his mother-tongue, putting the man at his ease at once, and, after giving him a kindly refusal, get a directory and make a list of architects for the man to look up, giving his valuable time without a thought, except for the feelings of the lonely foreigner.

The profession of architecture will miss him sadly; he worked hard and faithfully for the development of the best in the profession. By his indomitable will and strong manly character, he has inspired every one who came in contact with him to do his best.

My seven years with him were important to me, not alone on account of the business training — he was an inspiration, never weary, never careless, but always developing and encouraging others. He was the most easily approached, and yet the most unapproachable man when not understood, in the profession.

The monument to his memory is already completed, and consists not less in the love and respect of those who had the good fortune to work under him, than in the buildings erected by him.

Very respectfully, Frank E. Wallis.

Exhibitions

Boston, Mass. — *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

Notes & Clippings

A Legend about Shot-making. — The shot-making trade has a legend which recites that back in the days when guns were shot off by lighted matches and were swivelled to supports because they were too big and clumsy to be lifted to the shoulder, and when all shot was molded as bullets are to-day, some workmen were fastening an iron grating to the wall of a castle. They had cut out the hole in the stone, and, after placing the iron in the hole, poured some lead in to hold the iron in place, just as they do to-day. Some of the lead escaped and ran over the edge of the wall into the moat below. Soon after the attention of the soldiers was attracted to the lead in the clear water, and, dipping it out, they found that the metal in falling from the height had become globules. After that those soldiers made their bullets by sprinkling melted lead over the castle wall into the waters of the moat. — *Hardware.*

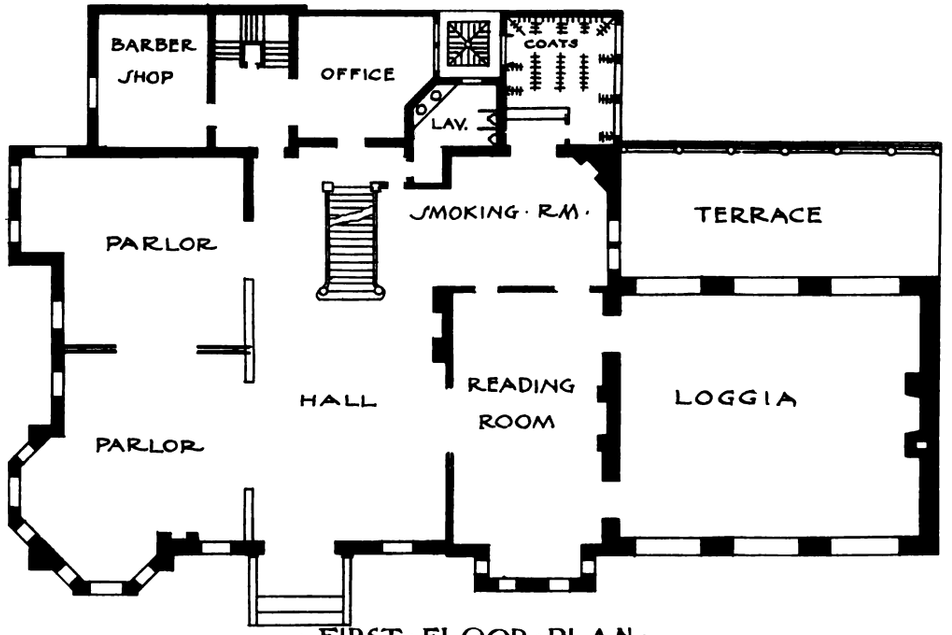
Electric Heat as applied to Founding. — The possibilities of electric heating have been startlingly illustrated at the Homestead Steel Works. In the Bessemer process, the change of the iron into steel is accomplished while the metal is reduced by intense heat to a fluid condition. This heat has to be maintained for a considerable time, for, if the metal begins to chill, the success of the whole operation is impaired. The prevention of the chilling has always been a problem with steel men. Recent developments in the power of the electrical furnace have shown that it is possible to obtain enormously high temperature by the use of heavy currents, and this discovery has been utilized at Homestead. A heat was allowed to become somewhat "cold," and the current was turned on. About twenty tons of molten steel that was lying dead in the ladle immediately began to boil, and in a few moments reached a white heat. The blaze ascended several feet above the ladle, and was of blinding intensity. The unaccustomed degree of heat and the dazzling glare made the operation of pouring the steel most trying, and many of the workmen had their eyes burned badly. The test was almost too much of a success. In reality, it was a terrible demonstration of the frightful temperature which it is now possible to obtain by human agency. Probably not more than temporary injury was sustained by the workmen, but in future they will be provided with blue glasses, so as to withstand the intense light, and in future provision will be made to have the charge of current, which at the test was excessive, under perfect control. — *N. Y. Times.*

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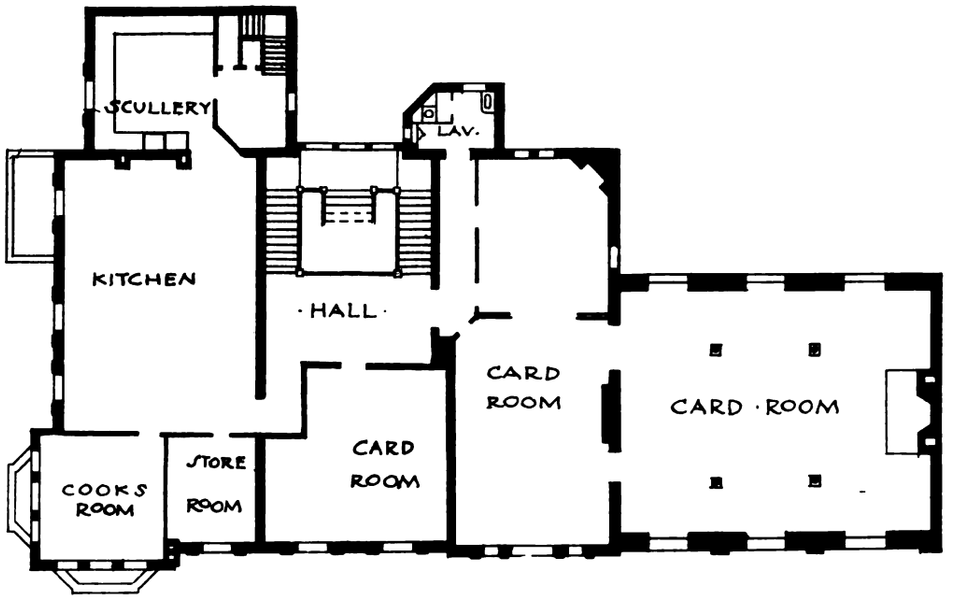
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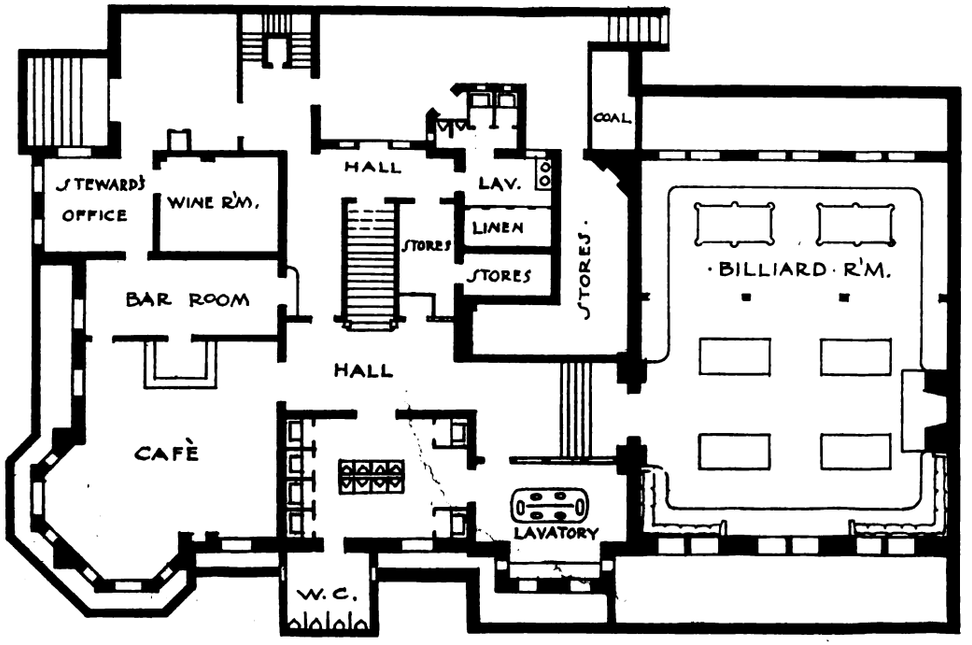
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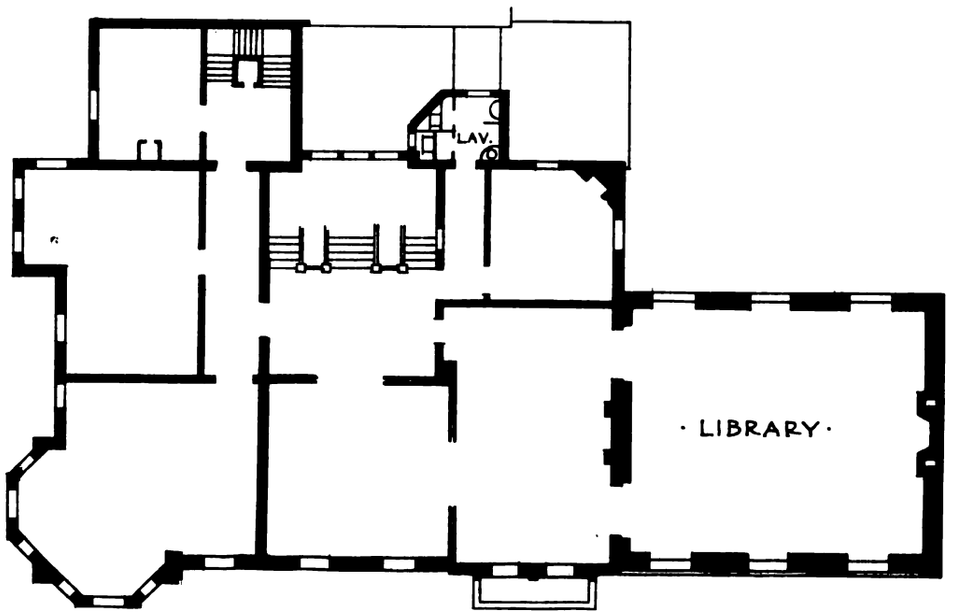


· FIRST · FLOOR · PLAN ·



· THIRD · FLOOR · PLAN ·





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BASEMENT PLAN

SECOND FLOOR PLAN



H: Street Elevation:

Additions to The Metropolitan Club:
Washington D:C:
Wm A: Potter Arch!

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DWELLING AT MONTCLAIR, N.J.

FOR MR. H. J. CHAPIN.

F. COLBURN, ARCHITECT. MORRISTOWN, N.J.

Sketch Plan.

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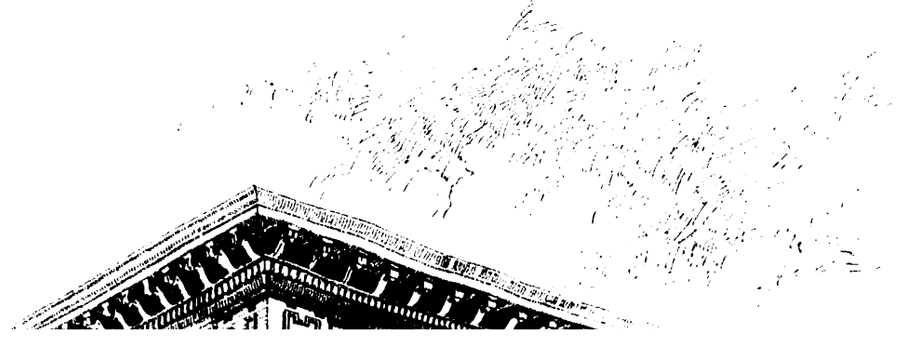
THE MONADNOCK APARTMENTS

MONADNOCK AND DUDLEY STS

DORCHESTER MASS

DWIGHT AND CHANDLER ARCHITECTS

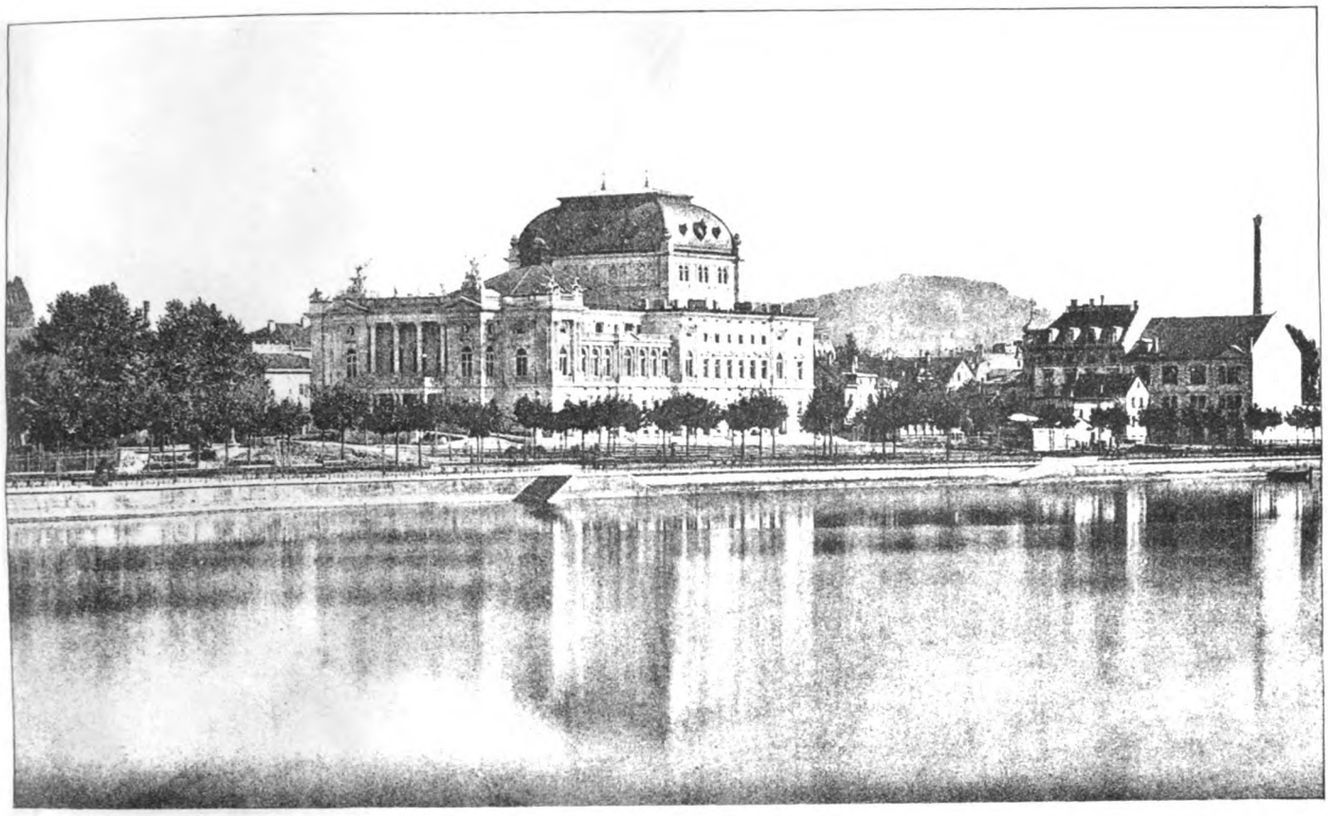
BOSTON MASS



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NEW STADTTHEATER IN ZURICH.

FELLNER & HELMER, Architects.

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AUGUST 24, 1895.

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AS will be seen by a communication in another column, a committee of architects, engineers and representatives of insurance companies in New York has arranged to make an extensive series of tests of fireproofing materials, on a scale comparable with the conditions which exist in the case of fires in actual buildings. If the tests are well carried out, as they undoubtedly will be, they should add very much to our knowledge of the art of constructing buildings to resist fire, an art in which the Americans already excel. It will be remembered that a somewhat similar experiment was carried out in Berlin a year or more ago, an old house having been protected with a variety of materials, and then set on fire. The experiments, of which we gave an account at the time, were conducted with characteristic German thoroughness, and a set of metal bars, fusing at different but known temperatures, were placed in each room, to determine the actual degree of heat to which the fireproofing material in that room had been exposed. A very similar experiment was made later, at Vienna, if we recollect rightly, where an iron column, standing in the middle of a room built for the purpose, with brick walls, was cased over with four-inch brickwork, and a set of fusible bars put inside the casing, next the columns, and, after placing about the room blocks of various kinds of stone, the remaining space was filled with wood, which was set on fire. The heat, which was measured in the open room, as well as inside the column casing, by fusible bars, was so intense as to disintegrate some of the samples of stone, but it failed to affect the iron column, the temperature inside the brick casing not even rising high enough to melt the fusible bars. In the case of the New York tests, it is intended to try the effect of water as well as fire, and there is no doubt that the ingenuity of the committee will be successfully exercised to reproduce the conditions incident to real conflagrations. It is by such trials as this that our future building is to be made really enduring, and the public is, or should be, deeply interested in having them thoroughly carried out.

WE have received a copy of the new form of contract of the Royal Institute of British Architects, which is, of course, very interesting. Unlike our official form, it was not prepared by joint representatives of architects and builders, and, in fact, the London association of builders has already expressed its disapproval of it, and advised its members to refuse to sign it; so that it seems to be questionable how much use will ever be made of it, at least in London.

APART from this consideration, however, the document has what appear, to American eyes, grave defects, both in form and substance. Strangely enough, the first page only, out of the seven pages bound together, is intended to be signed, the other six consisting of a "Schedule of Conditions," which are referred to in the signed page as something "to be read and construed as forming part of this Agreement." It is quite likely that the English are more honest than we are, and it may be for this discreditable reason that we are more prudent than they; but it is certain that American builders would hesitate to sign a contract anywhere but on the last page, and even then would object to a seven-page form out of which four pages could be taken, by cutting a thread, and replaced by four other pages, leaving their signature intact. Of course, this does not mean that it is the habit of American architects or business men to make surreptitious alterations of contracts if they get a chance; but the art of avoiding law-suits consists principally in leaving no possible opportunity for fraud or mistake.

ANOTHER piece of carelessness, as we should think it, which we find in the signed page, consists in leaving a space of only about an inch and a half in length for writing in the contract price. It would be strange enough to have the consideration for an important building appear, over the signatures of the parties, in figures only, yet there is not room enough to write out one-fourth of the words necessary to express an ordinary contract price. The "Schedule of Conditions" has no blank space whatever for inserting the contract price; so that the only way by which the intention of the parties as to the price to be paid can be ascertained, in case of controversy, is by deciphering a row of figures, which, in most cases are nearly illegible, at best, and can be fraudulently altered with the greatest ease. It is to be remembered that each party has, usually, one of the copies of the contract in his possession. If either party should find it convenient to change the figures in his copy so as to represent a few thousand pounds more or less than they originally did, nothing would be easier than to add a few hair lines or blots for that purpose; and, in case of subsequent dispute, his copy would have exactly the same standing before a court as the other party's copy. Supposing, for the sake of illustration, that the builder has changed £10,000, in his copy of the contract, to £16,000, and has sued for the extra six thousand pounds, the assertions of the owner that the figures were increased by fraud or forgery would be met with the counter-assertion that the owner had himself fraudulently scratched out the tail of the figure 6 from his copy; and the jury alone would have to decide which party to believe. Notwithstanding the well-known infallibility of judgment of the "twelve good men and true" who form the glory of British jurisprudence, we imagine that a Londoner, about to build in Ireland, or Wales, with native contractors, would think twice before exposing himself to the chance of having such a question decided by the local juries. In this country, a bank would refuse to pay a check, even to a well-known customer, which had the amount expressed only in figures; and we doubt whether a building contract drawn in such a way could be enforced. The courts have already held here that figures are a mere memorandum, and it is not impossible that they would, if the evidence showed that there was a real misunderstanding between the parties as to what the intended contract price was, declare that the document did not, by mere figures, fix the consideration so as to exclude evidence that something else was really agreed upon.

THIS probably seems like quibbling over words, but to use words so plainly and fully as to show just what is intended, without having any chance for fraud, misunderstanding or mistake, is the very soul of contract-writing; and many millions of dollars are spent every year in litigation, simply because the parties were not careful enough about the wording of their agreements. Taking up, however, the substance of the document, we do not find ourselves much consoled for the defects which appear to us in its form. The

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very first clause says that the contractor is to "execute and complete the works shown upon the said drawings and described in the said specification." We have already described at length the objections to this phrase, which only requires the contractor to do the very small part of the work of building a house which can be shown on drawings and described in the specification in such a way as to satisfy a prejudiced jury that it is really and distinctly indicated — not implied, in both. The best builders here reject the similar clause in the official American contract, and, in their proposals, offer, not to do work shown in the drawings and specifications, but to *build the building* which forms the subject of the contract, according to the drawings and specifications; and most of our architects, in their contracts, use this expression, instead of the official form. As an example of the way in which the meaner class of builders interpret a contract of this sort, it is related that a contractor in Massachusetts, not long ago, refused to make any openings into the chimney-flues in a house he had been building, unless he were paid extra for doing so. There were, in the contract drawings, no plans, elevations and sections of the stove-pipe holes, and the description of them in the specification availed nothing with a contract which, like the official American and the Royal Institute form, did not require him to do work shown on the drawings *or* described in the specifications, but only such work as was shown or described in both. Architects can best appreciate the proportion of the total work involved in the construction of a house that it is possible to show and describe simultaneously by specifications and drawings, and the English members of the profession should find food for reflection in the thought that this proportion is all that the contractor is bound to do under the new form of agreement.

BUT it is in the third clause that we find the most astonishing stipulation. Here it is recited that "The term 'the Architect' in the said Conditions shall mean the said Blank, or, in the event of his death, or ceasing to be the Architect for the purpose of this contract, such other person as shall be nominated for that purpose by the Employer, not being a person to whom the Contractor shall object, for reasons considered to be sufficient by the Arbitrator mentioned in the said Conditions." Thus it appears that, in case of the death or dismissal of the architect of an important building, it is the contractor and the arbitrator who together dictate to the owners the appointment of his successor. We doubt very much whether any American owner would submit to such a limitation of his discretion in the choice of a professional adviser. It is true that, as the original architect is agreed to by both parties to the contract, it is only fair that his successor should also be acceptable to both; but the consequences of stopping proceedings on an important building, to haggle, perhaps for months, over the appointment of a new architect, might be ruinous to the owners.

DR. LILIENTHAL, whose attempts at flying, with artificial wings, have made his name known throughout the civilized world, recently invited the Berlin Society of Architects to witness some of his experiments. A large company of members, with ladies, accordingly proceeded to Lichterfelde, where Dr. Lilienthal has made, in the neighborhood of the brick-yards of the Lichterfelder Bauverein, a mound of sand, about fifty feet high, which serves him as a starting-point for his aërial excursions. The experimenter brought with him two pairs of wings. One, intended for voyaging in still weather, comprises a pair of wings, of ten metres spread, or about thirty-three feet, made of a frame of reeds, covered with cotton shirting. The body of the aeronaut is inserted through a hole in the frame, the arms extending over the wings, with cushions under the shoulders; and buckles and straps, with a pair of light wooden stirrups, give control of different points of the frame. The front portion of the wings is connected to the body by rubber bands, so that it can flap slightly, this being intended to prevent the navigator from alighting on his head. Projecting to the rear is a rudder, with both vertical and horizontal blades.

DR. LILIENTHAL began his proceedings by putting on his fair-weather wings, and, ascending to the top of the sand-hill, he jumped off. Something, however, was wrong about the apparatus, and in a moment he landed prostrate on the ground. Fortunately, he was not injured, and, taking off the unfaithful wings, he put on a second pair, which is in construction similar to the others, but of smaller spread, being destined for windy days. With this apparatus he essayed a second flight, with success, passing over the heads of the spectators, and landing safely on his feet a little beyond the foot of the hill. The spread of these wings was insufficient, in a still day, to sustain him for a long flight, but, as the *Deutsche Bauzeitung* informs us, with suitable apparatus he is able to fly three hundred feet or more. This is quite different from the flights of a mile, at an elevation of two hundred feet above the ground, of which the daily newspapers occasionally talk; but it is just as much to Dr. Lilienthal's credit to have devised means for flying a hundred metres as a thousand. In fact, it should be understood that Dr. Lilienthal has no idea of fitting out people to fly, like birds, by means of their own muscles. His experiments are undertaken solely to learn the conditions of atmospheric buoyancy, and resistance to impact, and he has chosen an extremely efficient mode of instructing himself on these points.

A NEW idea for improving the comfort of railway travellers has been produced by the French Minister of Public Works, who seems, for an official, to have an extraordinary sympathy with the feelings of his fellow-men. As *La Construction Moderne* says, every traveller has observed the disputes about seats which frequently arise in railway-cars. If a traveller, who has by coming early to the station secured a good seat, alights at some frontier or refreshment station, he is very likely to find, when he comes back, that some one else has appropriated his place. Even if he puts a bag or some other piece of property in his place, to show that it is taken, he often finds that this has been coolly removed, to make room for the usurper. There is a certain justification for this, in the fact that many people, especially the English, as our contemporary informs us, are in the habit of piling their baggage on all the seats around them, so that, after the train has started, they may find themselves alone in their compartment; but it is the modest and scrupulous traveller who suffers most from impositions of both these sorts. In order to avoid at once the monopolizing of a number of seats by any individual, and the appropriation of places by people not entitled to them, with the scenes which occasionally result from this appropriation, the Minister of Public Works suggests that railway employés should be provided with pins, each carrying a strip of cloth; and that when a passenger is shown to a seat, the pin should be inserted in the cushioned back of the seat, to indicate that the place is occupied. This would show at once to people looking for seats in a train how many places had been taken, and where there was a vacant one that they could claim. It is evident that an unscrupulous person might take out the pin, and pretend that he found the seat unmarked, but the Minister proposes that a fine of twenty dollars should be imposed for meddling with marks of this sort, and a few arrests would probably check the practice. An arrangement of this sort would certainly add greatly to the comfort of travellers on the Continent. Whether it could be adopted here is another question. With us, after a passenger's money is safely lodged in the cash-box of the ticket-office, all regard for his comfort ceases, and the grumpy permission to hunt up a seat for himself, or, if he cannot find one, to stand, is the most that he can venture to expect. However, if he cannot have a railway servant to secure his place for him, it might perhaps be possible to enable him to secure it for himself. If, at the ticket-office, decorated pins or tags could be bought for a few cents, which might be attached to the purchaser's seat in the train, to reserve it in his absence, travellers would be enabled to enjoy a great deal of rest and change, by leaving the cars for a moment at stations, that they cannot get now, except at the risk of losing their seats. It might be made by statute a misdemeanor to remove one of these marks, and it should also be made one to attach a mark to one seat in the train, and occupy, or similarly mark, another seat. Then the abuse so frequently seen here, where a man fills up two seats in an ordinary car with his baggage, and then sprawls over two more seats in the smoking-car, thus claiming four seats for himself in a train where, frequently, other passengers, too scrupulous to take a seat which they suppose to be engaged, are standing, would be put an end to, much to the advantage of travellers, as well as of the railway companies.

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ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — XIV.

THE NATIONAL CODE OF RULES FOR ELECTRIC WIRING. — VII.

27. FIXTURE WORK: —

a. In all cases where conductors are concealed within or attached to gas-fixtures, the latter must be insulated from the gas-pipe system of the building by means of *approved* joints. The insulating material used in such joints must be of a substance not affected by gas, and that will not shrink or crack by variation in temperature. Insulating joints with soft rubber in their construction will not be approved.

[Section *a*. Insulating joints to be *approved* must be entirely made of material that will resist the action of illuminating gases, and will not give way or soften under the heat of an ordinary gas-flame. They shall be so arranged that a deposit of moisture will not destroy the insulating effect, and shall have an insulating resistance of 250,000 ohms between the gas-pipe attachments, and be sufficiently strong to resist the strain they will be liable to in attachment.]

b. Supply-conductors and especially the splices to fixture wires, must be kept clear of the grounded part of gas-pipes, and where shells are used the latter must be constructed in a manner affording sufficient area to allow this requirement.

c. When fixtures are wired outside, the conductors must be so secured as not to be cut or abraded by the pressure of the fastenings or motion of the fixture.

d. All conductors for fixture-work must have a waterproof insulation that is durable and not easily abraded, and must not in any case be smaller than No. 18 B. & S., No. 20 B. W. G., No. 2 E. S. G.

e. All burrs or fins must be removed before the conductors are drawn into a fixture.

f. The tendency to condensation within the pipes should be guarded against by sealing the upper end of the fixture.

g. No combination fixture in which the conductors are concealed in a space less than one-fourth inch between the inside pipe and the outside casing will be approved.

h. Each fixture must be tested for "contacts" between conductors and fixtures, for "short circuits" and for ground-connections before the fixture is connected to its supply-conductors.

i. Ceiling-blocks of fixtures should be made of insulating material; if not, the wires in passing through the plate must be surrounded with hard-rubber tubing.

There are numerous opportunities for trouble in the wiring about gas-fixtures. The fixtures themselves are of metal, and the wires must necessarily be run in confined spaces and close to this metal; the gas-pipe system forms a conducting net-work throughout a building and has good connection with the earth; any defect that causes an arc is apt to burn through the gas-pipe, ignite the gas and immediately start a dangerous blaze.

The greatest danger of accidental connection is between wires and the fixtures, and consequently it is required that the fixture be joined to the gas-pipe system by means of an *insulating joint*. Figure 64 shows one form. This insulating-joint allows the gas to pass through, but insulates the fixture so that in case a wire were to become electrically connected with it, a connection somewhere else in the building, such as between the other wire of the circuit and a fixture, would not cause a flow of current through the gas-pipe system. Were this to occur, there would be a short-circuit with a heavy flow of current, and an arc would be formed at the points of contact that would quickly burn through the pipe. By insulating the fixture entirely, to cause a short-circuit it is necessary that two accidental connections on the same fixture should occur, and these two connections must be on opposite sides of the circuit — one connection for each wire or pole.

Figure 65 illustrates the effect of having no insulating joints. If, for instance, the wire *C* coming from the *A* wire of the circuit were to have connection with the fixture at *E*, and the wire *D* coming

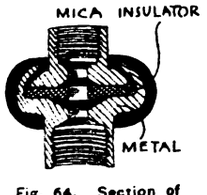


Fig. 64. Section of Insulating-Joint.

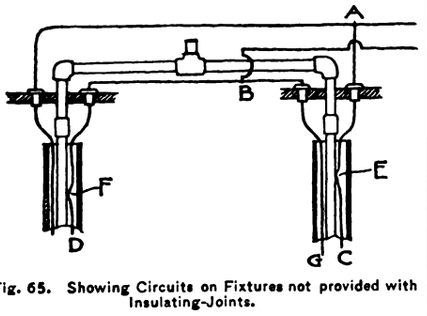


Fig. 65. Showing Circuits on Fixtures not provided with Insulating-Joints.

from the *B* wire of the circuit were to have connection with any one of the numerous fixtures of the building as at *F*, then a heavy current would immediately flow from *A* through *C*, thence to the fixture and gas-pipe at *E*, through the gas-pipe system and other fixture to *F*, through the fixture wire *D* to *B*, the other side of the circuit. If there were insulating-joints in these gas-fixtures, as in Figure 66, two connections like those supposed could not cause a short-circuit, because there would be no path from *F* to *E* through the gas-pipe, as the current could not pass the insulation in the joints. To cause trouble it would be necessary to have not only the connection at *E*, for instance, but another connection with the same fixture somewhere along the wire *G*. The insulating-joints by cutting off each fixture by itself reduce greatly the probability of trouble.

Rule 27 (*a*) and the accompanying note specify in detail the standard that must be reached by an insulating-joint and incidently suggest the many ways in which a joint may be dangerously defective. The underwriters furnish lists of the insulating-joints that have been tested and approved.

There is an opportunity for careless work at the tops of fixtures where the *supply conductors* (Fig 66) come through the ceiling to be attached to the *fixture wires*. These supply-wires are brought down close to the gas-pipe to which the fixture is attached and should, as Rule 27 (*a*) requires, be kept carefully away from the part of the gas-pipe system that is connected with the ground. *Shells* (Fig. 66) are ordinarily used, and as these cover up the work there is less inducement for the workmen to do the work carefully, even when the shell is large enough to take the wires and splices without crowding.

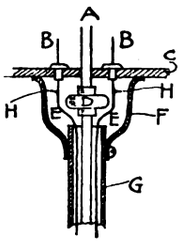


Fig. 66. A. Gas-pipe; B. Supply-conductors; C. Ceiling: D. Insulating-Joint; E. Fixture Wires; F. Shell; G. Outer Casing of Fixtures; H. Splices.

Burrs and *fins* are the sharp edges left when the sheet-metal composing the fixtures is cut. These, if left, will injure the insulating covering of the wire when it is drawn over them.

The upper ends of fixtures are usually *sealed* by wrapping tape [See remarks under Rule 12 (*a*)] about them until they are virtually air-tight.

The gas-pipe running down through the fixtures is surrounded by a larger tube or *casing*, and between these the electric wires are run. If this space be too small for the wires to be drawn through easily, the insulation is apt to become abraded.

The testing required in Rule 27 (*h*) can of course be satisfactorily done only by those familiar with the work.

Fixtures are often fastened against a block that is attached to the ceiling. If this *ceiling-block* be not itself of a material suitable for bushings, there should be used a regular insulating bushing, such as would be used through the ceiling itself.

28. ARC-LIGHTS ON LOW-POTENTIAL CIRCUITS: —

a. Must be supplied by branch conductors not smaller than No. 12 B. & S. gauge.

b. Must be connected with main conductors only through double-pole cut-outs.

c. Must only be furnished with such resistances or regulators as are enclosed in non-combustible material, such resistances being treated as stoves.

Incandescent-lamps must not be used for resistance devices.

d. Must be supplied with globes and protected as in the case of arc-lights on high-potential circuits.

Arc-lights are often run from the same circuit that supplies incandescent-lamps, by connecting two in series between the two wires of the circuit (Fig. 20). Each lamp takes from 50 to 55 volts and the two can therefore be operated by 110 volts of the low-potential circuit. It has been remarked that with a regular series-circuit the dynamo is so regulated that it maintains a constant current. The circuit operating incandescent-lamps being at a constant pressure, it is necessary to have with the arc-lamps resistances that will be cut in or cut out automatically as the resistance of the arc-lamps decreases or rises with the feeding and burning of the carbons. From remarks under Rule 12 (*b*) it will be understood why fuses cannot be used with a constant-current circuit, but they should be used with a constant-pressure circuit, and each circuit of arc-lamps on an incandescent circuit should have double-pole cut-outs with fuses, just as incandescent-lamps or motors would.

The resistances used with arc lamps heat as any resistance does when a current is forced through it, and when the lamps get badly out of order the resistances sometimes become greatly overheated. As the rules state, it is necessary to install these resistances only in such places and in such ways as would be proper if they were small stoves.

Incandescent-lamps have a definite amount of resistance in their filaments and they are made to stand considerable current for their size, so that they make convenient resistance devices. They are poor for this purpose, however, for if any of the lamps burn out, it may upset the balance and cause excessive current as in multiple-series or series-multiple systems of lighting. [See remarks under Rule 14 (*c*).]

29. ELECTRIC GAS-LIGHTING: —

Where electric gas-lighting is to be used on the same fixture with the electric-light —

a. No part of the gas-piping or fixture shall be in electrical connection with the gas-lighting circuit.

[1] Continued from No. 1023, page 49.

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b. The wires used with the fixtures must have a non-inflammable insulation, or, where concealed between the pipe and shell of the fixture, the insulation must be such as required for fixture wiring for the electric light.

c. The whole installation must test free from "grounds."

d. The two installations must test perfectly free from connection with each other.

The lighting of gas by electricity requires only battery power of low electrical pressure, and neither the insulation on the wire nor the method of construction need be nearly so good for satisfactory operation as must be the electric-light wiring. Often the gas-pipes are made to serve as one wire of the gas-lighting circuit. Connection between the gas-lighting system and the electric-light system exposes the inferior insulation to the comparatively high pressure of the light system and such cross connections can cause serious damage. Accordingly where the two systems are used together on the same fixture, it is required that the standard of the gas-lighting wiring be raised virtually to that required for the lighting wiring.

30. Sockets:—

a. No portion of the lamp socket exposed to contact with outside objects must be allowed to come into electrical contact with either of the conductors.

b. In rooms where inflammable gases may exist, or where the atmosphere is damp, the incandescent-lamp and socket should be inclosed in a vapor-tight globe.

The *socket* (Figs. 67 and 68) is the brass receptacle into which the lamp itself is fastened. One terminal of the lamp filament is attached to the brass band about the lamp base and the other terminal of the filament is attached to the smaller brass piece coming out of the centre of the lamp base. The wires are brought into the socket and attached to terminals that are so arranged that when the lamp is fastened in the socket each end of the filament is in electrical connection with one of the two wires of the circuit.



Fig. 67. Keyless Socket.



Fig. 68. Key Socket.

The space within the socket is small and while there is room for the conductors to enter and to be attached to the socket terminals, carelessness in making the connections is apt to leave projecting one or more fine wires making up the conductor, so that it is free to come into contact with the socket.

There is considerable likelihood of short-circuits in sockets, and while the fuses allow an excessive current to last only momentarily, if there were inflammable gas present even the very short flash would be sufficient to ignite the gas. Where the atmosphere is damp, short-circuits in the sockets are apt to be numerous and while there is a probability that the fuses will take care of these, it is poor practice to depend upon safety-devices when the trouble may be prevented. *Vapor-tight globes* (Fig. 69) cover both the lamp and the socket and are an effectual protection. It is well to use them when fine dust accumulates about the socket and the attached conductors.

31. Flexible Cord:—

a. Must be made of conductors, each surrounded with a moisture-proof and a non-inflammable layer, and further insulated from each other by a mechanical separator of carbonized material. Each of these conductors must be composed of several strands.

b. Must not sustain more than one light not exceeding 50 candle-power.

c. Must not be used except for pendants, wiring of fixtures and portable lamps or motors.

d. Must not be used in show windows.

e. Must be protected by insulating bushings where the cord enters the socket. The ends of the cord must be taped to prevent fraying of the covering.

f. Must be so suspended that the entire weight of the socket and lamp will be borne by knots under the bushing in the socket, and above the point where the cord comes through the ceiling-block or rosette, in order that the strain may be taken from the joints and binding screws.

g. Must be equipped with keyless sockets as far as practicable, and be controlled by wall switches.

Flexible cord is the name given to the species of twin wire that is formed by twisting two stranded conductors covered with insulation about each other so that they make one cord or piece. It is much used for pendant lamps and for portable lamps and motors, but its convenience tempts one to use it in many places for which it is not at all suitable. Since the conductors forming the two sides of the circuit are twisted close together, it takes very little abrasion or injury to the insulating covering to make a connection between these two conductors and thus form a short-circuit. In addition to the usual dangers of short-circuits, the silk or cotton braid covering the wires is apt to take fire from the flash.

The rules require that each conductor of flexible cord be made up of several strands, because if a solid conductor be moved about as if it were perfectly flexible, it will sooner or later break off and cause trouble. Each conductor is to be surrounded by a non-inflammable layer to preserve the insulation in case of overheating, and there is also to be a moisture-proof layer of insulation so that accidental moistening will not cause a short-circuit. The wires being also separated by a carbonizable material, if bad leakage do occur this carbonizable separator will become a good conductor, will help the passage of a heavy current, and so quickly cause the melting of a fuse and the stoppage of further current. The two insulating layers are required so that liability of leakage between the wires may be reduced to a minimum, but when leakage does occur it is thought better to have it cause a short-circuit immediately and blow the fuse.

Flexible cord is not intended to sustain weights and the rules limit the weight that may be suspended, to one incandescent-lamp not exceeding in size a 50 candle-power lamp.

Flexible cord is not allowed in show-windows even for pendants. There is always liability of its short-circuiting and thus causing at least a momentary blaze and perhaps a scattering of particles of molten metal. With the inflammable material usually present in show-windows, these short-circuits that might amount to little elsewhere, may here quickly start a fire.

Where the cord enters the socket there is gradual wear of the insulation by abrasion unless the hole be bushed with an *insulating bushing* (Fig. 70). When the insulation is scraped from the ends of the conductors so that they may be connected to the terminals in the socket, the outside braid is apt to become frayed. These light ends are inflammable and would quickly catch fire from a small arc in the socket. It is accordingly required that the ends of the conductors be wound with tape to bind down the loose covering.



Fig. 69. Vapor-tight Globe to cover Lamp and Socket.



Fig. 70. Insulating Bushing for Socket.

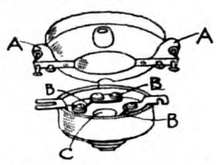


Fig. 71. Ceiling-block or Rosette: A. Connections for Supply Conductors; B. Fuses; C Hole for Flexible-cord, against the sides of which the Knot bears; D. Binding-screw for Cord.

If a cord pull directly from the binding screws holding it in the socket or in the ceiling-block or *rosette* (Fig. 71), the strands are apt to pull out from under the screws and either leave too few strands to carry the current safely, or leave loose ones to fly against the other wire of the circuit and cause an arc. The holes in the socket bushing and in the rosette are little more than enough to allow the cord to slide through them and by tying a knot in the cord after it has passed through these holes, the knot comes against the walls of the holes and relieves the binding screws of any strain.

Every socket that has a key for turning the light on and off, has virtually a switch within it that draws a slight arc when it operates, and that is liable to get out of order. It is well to get rid of these small switches as much as possible and so reduce the chances of trouble. With *keyless sockets* (Fig. 67) the connections are permanently made and several lights are turned on and off by one switch on the wall or in a switch closet. This switch is larger than the socket switches and as there is not so limited a space in which the parts must be assembled, they are less likely to get out of order.

Decorative "series" lamps would never be operated on a pure series circuit, but would be operated on a multiple-series system, strings of lamps being connected in between the wires of a constant-pressure circuit (Fig. 45). Rule 14 (*c*) prohibits any system of series-multiple or multiple-series lighting for incandescent-lamps, but the rule applies only to circuits of 300 volts or over. The reasons for this rule will apply with more or less force to all series-multiple and multiple-series lighting, and the danger is considerably increased with decorative lamps because they are usually surrounded by inflammable material.

Russell Robb.

(To be continued.)



THE WORLD'S FAIR RUINS AT JACKSON PARK.— THE ART BUILDING.— THE GERMAN PAVILION.— THE MIDWAY CANAL. — CHICAGO UNIVERSITY BUILDINGS.— OFFICE-WORK STILL DULL.— THE ARCHITECT OF THE NEW POST-OFFICE STILL UNSELECTED.— HOLMES'S CASTLE.

IF, after some fifty or a hundred years of life in the New Jerusalem, one could be permitted to return to the scenes of former life, and should find that in spite of most cherished memories of bright and happy surroundings all had changed and that most of the beloved objects had vanished, which in memory had appeared beautiful by the side of even heaven itself, one would experience a little of

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the sensation felt in revisiting the site of the World's Fair at Jackson Park. The man who could go there and shed tears must feel comparatively happy, in finding an expression for that awful sense of loneliness, depression and sorrow, that comes over one as he wanders over the site of the once beautiful creation. There is here and there just enough of some feature left to make you feel you have only to turn your eyes and all the rest will come. What does actually come is an involuntary sense of disappointment, such as a child must have when he bites on a china cherry, expecting that it is the natural delicacy.

One feature which strongly impresses itself on the visitor is the gigantic amount of work which there actually was in the World's Fair undertaking.

It is now nearly two years since the Exposition closed, and yet, with the exception of a comparatively small part in the northern end and the entire part of the Midway Plaisance, the utmost chaos still prevails. Evidently what was under ground was nearly as much as that seen above. The buildings are practically down, the huge central pavilion of the Government structure is now being worked upon, the Liberal Arts stands a heap of twisted and distorted iron-work owing to its fiery exit, and the girders of Machinery Hall are now hanging, many of them, midway between the earth and the springing arches which in part rise above them. If any one imagines that the buildings were simply and neatly removed, and the park stands comparatively as it was two years ago, he would find himself surprised on visiting the place. Not a road remains in good condition. They have all been torn up and in many places obliterated in removing water and sewer mains, electric-light wires, etc. What were once beautiful patches of greensward are now shapeless masses of lime, dust, hair and plaster, in which bits of tin and patches of pig-weed contend for a second place. Many of the bridges even have been taken down, for though perhaps strong enough in themselves, their abutments were only staff and boards, and are fast crumbling away. Much of the curbing bordering the ponds and lagoons, being of similar character, is fast approaching a like fate and many a massive pillar has its half lying prone on the ground, displaying to strangers its unsubstantial vitals. Gazing southward from near the site of the Government Building, a desolate stretch greets the eye. Steam dredging-machines fill with their gray smoke the air, which is already full of dust and dirt raised by hundreds of laborers and teams bringing in and taking away soil and rubbish. Through the smoke-laden atmosphere, the figure of the Republic rises dim among the ruins, now in white, all except the globe which she holds in her upstretched hand. Dim and spectre-like, two of the huge steers once in front of the Agriculture Building, toss their heads above the mass around them, while two cowering creatures, like beasts of prey around some ancient ruin, crouch among the fast-growing underbrush, where was once the bridge leading west from the Liberal Arts. Palmyra of the desert in her desolation could not have been more desolate, and the difficulties of restoring a ruined city become apparent.

Entering the park at the northern end, the former Art Palace, now the Fields Columbian Museum, looms up with its grand proportions. Time has not dealt gently with it in the two years that have passed since ninety-three, and in looking at its discolored walls and generally shabby appearance, you are at once glad that the other buildings went as they did, so that no untidy ruin will mar their glorious remembrance. At the north of the Museum where all the State buildings clustered, all is clear and glaring — a long sweep of macadamized roads and grass. The ghostly form of Mackay's spectatorium has vanished, and the neat pavilion which Iowa incorporated into her building and was to leave intact when the building was removed stands fresh and jaunty on the beach. The Museum has been kept unchanged in most particulars in the interior as well as exterior, and "a feeling of sadness steals o'er one, which is almost akin to pain" on entering its once so well known halls.

Opposite the entrance, the German model of the Berlin Parliament House stands white and fresh before you, while a case of the reproductions of the old Celtic jewelry and sacred relics recalls the glories of one corner of the Manufactures Building. Much of interest is to be seen in the place, and doubtless much which as the years go on will be weeded out. Every few steps some familiar object brings to your mind that ever-to-be-remembered creation of ninety-three, and even a guardian in the fresh bright uniform of the Columbian Guard produces a sensation, and you murmur, "It was a dream. Oh, let me dream again."

The models of much of the World's Fair statuary are grouped in the central pavilion and are evidently most carefully guarded, as no one is allowed to wander among them, but must view them from the outside of the protecting cord. This collection will be one of a good deal of historical interest, and from an artistic standpoint of course has much worth. Near the Sixtieth-Street entrance to the park there are several little shops where casts of many of the architectural details of the Fair buildings, as well as many of the smaller figures are sold.

Passing down eastward from the Museum we reach the Lake Shore drive, which is now in good condition. Several things bring to the eye of memory the dream of two summers ago, indeed, so much so that we involuntarily search for the open pavilion of France, for the fascinating creation from Ceylon's spicy isle and the Victoria House. The "war ship," rather the worse not for war but wear of two stormy winters, still *stands* moored to the dock, and the German Building in all its quaint picturesqueness rises among the willows. Now that all the rest of the distracting attractions are removed, this German Building is well worth a visit and a more than cursory glance, as a very good example of the special style of decoration which it represents. It is to be hoped it will be kept in repair, and indeed, that these repairs will be made before it is too late, for it even now shows sadly the effect of rain and weather. If such a thing is permissible in the park a more charming building than this could not be obtained for a refectory where the inner man could be refreshed of a summer evening in sight of the blue lake and to the sound of a German band. "Old Vienna" might come to life again here. All south of the German Building is hopeless, disheartening chaos, with the Convent of La Rabida rising on an island, all the bridges being down at the extreme south; but turning westward it is possible by wading through sand and staff to look across to the Wooded Island to where the Hooden Palace stands. Viewed from a distance, for the bridges are down which lead to the island, this seems to be in very good condition and to be bearing up well against the inroads of time. So completely is it shut off from the rest of the turmoil of the park, that it might well be the enchanted palace of some Japanese sleeping beauty. Mr. Olmsted, who has charge of the grounds, will no doubt bring beauty out of the chaos. Already his skill is shown in the admirable way in which he has treated the elevated tracks of the Illinois Central, Michigan Central and several other roads that run directly at the west of the park. A ridge has been formed against them and trees planted on it, which, although as yet very small, almost completely hide the railroad structure. To the east of this ridge begins the first series of basins, now simply sowed down with grass, which will at some future time be transformed into the canal which is to run through that stretch of park which constituted the Midway Plaisance. This strip is already in orderly shape, macadamized roads, closely-shaven lawns and hundreds of small elm trees constituting its only beauty. It will, however, as years go on and the trees reach some size, be a very beautiful boulevard, with its houses on either side, its canal in the centre and spreading trees above it all. Mr. Olmsted is evidently planning for the future, and his work with the minimum of help from Dame Nature promises to be as fine as that done by him at the Columbian Exposition.

Just north of what was once the Plaisance, as many remember, stand the buildings of the Chicago University. Mr. Rockefeller has just given another paltry million to this institution, making a still more elaborate outlay possible. The more recent buildings are the Walker Museum and the Physical Laboratory, both buildings, as are all the others in the group, in the English Gothic style. They are of buff Bedford stone with red-tile roofs, and though not absolutely of the purest type have the style generally well carried out, and are very pleasing. The most attractive structure, so far, is the Physical Laboratory, a long building with its central portion rising into a square battlemented tower, the lower stories of which contain the well-designed central entrance. One other good-sized building is now in process of construction and the group is fast assuming an individual character. Placed in less hopelessly ugly surroundings it might be much more effective than it is at present, for any thing more dreary than the demoralized prairie on which it is situated would be hard to imagine. Most decidedly the landscape-gardener who works in this vicinity at the south of Chicago, must feel himself quite unhampered by any calls Nature may make upon him, as she has thrown out no hints of any beautiful possibilities. To the east of this section the Lake proves an attraction, and sand dunes and gnarled scrub-oaks were once a somewhat pleasing feature in this section, but the dunes and the oaks have about disappeared before the march of civilization, and a hopeless prairie rich only in tin-cans and pig-weed is what now remains.

Dulness in architectural circles seems to be the order of the day out here. All kinds of gossip is abroad relative to this and that complication in the different offices. These reports are rather difficult to sift down to their stratum of truth, and though the sheriff may not have been in possession of many or any of the offices, the actual truth of the matter is that in luxurious quarters, such as perhaps were warranted by work in prosperous times, many of the architects during this period of depression find themselves much hampered by an expensive corps of draughtsmen and large expensive office and draughting-rooms that they are unable to rid themselves of now that the times do not warrant such office expenditure. Though extremely dull now, architects are prophesying better times for the fall, as new building schemes are being talked of, and it would seem as if the height of the quiet season had been reached this summer. Another rumor current two weeks ago and which has since been substantiated is that of the withdrawal from the firm of Adler & Sullivan of Mr. Adler. The Crane Elevator Company, it seems, felt it would be to its advantage to have a man of such well-known reputation as Mr. Adler's for its special consulting architect and general manager of the sale department and, consequently, offered him a salary so large that it became a difficult task for him to refuse.

Another matter of somewhat personal interest and which we regret to note is the death of Mr. Karls, an architect of many years' practice, chiefly among the Germans of our city. Mr. Karls had for some time been much depressed and a few days ago shot himself in his office.

Perhaps dulness in summer work has forced into the race for a chance at the new post-office work many more architects than at first seemed inclined to join in it. A month ago there seemed but small

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desire on the part of many to make any effort for the work, but now about thirty names have been sent in to Secretary Carlisle. At one time it was reported that Mr. Cobb was the man destined for the big undertaking and the community felt safe in hoping that he would make the building a creditable monument to himself, and consequently a structure that Chicago would not be ashamed of. Mr. Clinton J. Warren is just now reported as the man most likely to obtain the position. Mr. Warren is well acquainted with Chicago, above ground and below, and should he have charge of the building there will be no danger of a repetition of the last Federal failure in our city in a building continually settling, cracking and falling.

The work of excavation for the temporary post-office has actually been begun on the Lake Front and as the whole structure must be up and ready for occupancy in ten weeks, a large force of men is put onto the work. The building will be nearly five hundred feet long and over two hundred feet wide, the central one hundred and sixty feet being two stories, while the rest consists of a one-story construction. It will be used for four years and must necessarily be somewhat substantial in character. It will have a brick foundation, an iron framework, but farther than this will be of wood.

A curious architectural freak which was last month been brought to light is the house owned by H. H. Holmes, the supposed murderer and swindler, about whom the papers have been so full of late. An innocent and commonplace enough looking house from the exterior, it has in the interior proved to be a veritable Bluebeard's castle —

> "Doors open into darkness unawares,
> Mysterious passages and flights of stairs."

but here stops the likeness to the house of the venerable New Hampshire governor. The home of Holmes appeared to be on the second story of a building in part above a drug-store and various other small shops. It consists of a flat of twenty-two rooms, not counting six halls. Nearly every room has two exits, some more, and those with only one are unpleasantly suggestive, having no windows and being plentifully supplied with trap-doors. The place is such as might even daze a native Bostonian, educated in the intricate ways of the cow-paths of his native city and warranted not to turn up on Scollay Square more than a dozen times on the same morning unless he wanted to. If the house was planned to confuse intended victims and make their escape in a hasty retreat impossible, it has fulfilled its mission, while a man thoroughly acquainted with the place would be better able to avoid pursuit and capture here than in almost any other place. In this flat of twenty-two rooms there are fine closets, two opening out of the same room, while one is built practically in the centre of one large room, making of it an ideal hide-and-seek place, especially as there are nine doors leading out of this room opening into various halls and large or small rooms, two of the doors leading into an apartment where two of the trap-doors are situated. This choice chamber is itself without windows.



CANADA

HARBOR IMPROVEMENT AT MONTREAL. — TWO NARRATIVE PAINTINGS. — POSSIBLE EFFECT OF THE CHICAGO DRAINAGE CANAL ON THE NAVIGATION OF THE ST. LAWRENCE. — DAMAGE BY LIGHTNING. — ACEYLENE, A NEW GAS. — ASPHALT AND OTHER ROADWAYS.

MONTREAL, seven hundred miles inland from the Atlantic, is the principal port of the Dominion, the head of the ocean traffic, passenger and merchandise, and the base of the inland carrying trade. Situated on the St. Lawrence River, whose current is very rapid and whose course to the ocean is impeded by several rapids and islands, immense sums have been expended in the course of years and as the requirements of trade demanded in order to keep Montreal *the* port. The canals constructed to circumvent the rapids are works of no small importance, and the deepening of the steamer channel from time to time in the St. Lawrence itself has been a work of very great expense. Montreal, consequently, has extensive quays and wharfs, but great as is their present area they have for long been found insufficient, and structurally are in no way in keeping with the importance of the trade carried out upon them. Months ago improvements were projected and Government engineers were employed to report on the projects. It is only recently that the Minister of Public Works has given permission to the Montreal Harbor Commissioners to make public the report of these engineers. The report deals first with the demands of the Harbor Board, which asks that the Government afford it such assistance as will enable it to receive in addition to the one million dollars, which they are already authorized to raise, a further sum of three million dollars — the money to be applied as follows:

Two million dollars for the execution of the plan known as No. 6, which has already received the formal sanction of the Government; one million dollars to build an inland basin, in the eastern part of the city; one million dollars to complete the basin at Windmill Point and other parts of the harbor not included in plan No. 6. The report continues: "The Harbor Commissioners in urging the expenditure of four millions point out that no public funds have hitherto been appropriated for the port of Montreal as for other ports, although the business transacted at Montreal consists very largely in the landing of goods either shipped to or exported from the West." Another million dollars will be contributed by the City towards the works. The Commissioners go on to say that they are of opinion that the Government should undertake the works as a matter of Dominion importance, and they suggest that a thorough survey of the river and shore should be made so that the best and cheapest plan may be prepared as a preliminary to this work of improvement. In a supplementary report, the Commissioners suggest a modification of the scheme to reduce the cost to two million dollars.

On the death of Sir John Thompson, late premier of the Dominion, who died at Windsor Castle a short time after an interview with the Queen, it was decided by the Dominion Government to have two paintings prepared, to commemorate as historical events two passages in the funeral ceremonies, which, owing to his death in England and his burial in Canada, extended over several weeks. One subject is to be the placing of a wreath by Her Majesty on the coffin, at the Castle — the other the transhipment of the coffin from the man-of-war to the tender in the harbor of Halifax, Nova Scotia. Mr. F. M. Bell-Smith was commissioned to paint both pictures and has just returned from England, where he has been accorded sittings by the Queen and all the persons present on the occasion at Windsor. The portraits will be about half life-size and the picture when completed will be hung in the Parliament House at Ottawa. Mr. Bell-Smith is a well-known Canadian artist.

The great drainage-canal of Chicago as it progresses towards completion is causing an immense amount of uneasiness in the minds of Canadians. It has been authoritatively stated that when complete, the canal will take away from the St. Lawrence 600,000 cubic feet of water per minute, and this seriously threatens the shipping interests of the St. Lawrence. It has yet to be ascertained by investigation whether there is any real foundation for the alarm, but the subject has been brought prominently before the inhabitants of the lands bordering upon the whole course of the great Canadian water-way, from the tidal-waters of the Gulf to the head of Lake Superior, by the unusual low-level of the waters and their continued sinking. The waters of Lake Ontario are at the present moment nearly three feet lower than at this time last year, and five feet lower than in August, 1892, and the water is still going down at the rate of an inch a day. Such a state of things is alarming, no doubt, and causes very much inconvenience to shipping, not to mention the water-supply of many places, and if to such an occurrence a further drain of 600,000 cubic feet per minute is added, we are afraid we shall have to import our drinking-water from the United States, and use up our vessels for kindling wood. The Chief Engineer of the Montreal Harbor Board has been sent to inspect the Chicago Canal and to report upon damage, if any, that is likely to be sustained by us, when the canal is opened. His report, naturally, is awaited with considerable interest.

A dry season in Canada is usually followed by an autumn of severe thunder-storms, and already reports appear of the damage done by lightning in various places. The manner in which lightning dealt with a house at North Bay, Ontario, in a storm on the night of August 6th, is interesting and instructive, as the course of the electric fluid can be clearly traced through its work of demolition. The lightning struck the chimney first, demolishing it and scattering brickwork through the roof into a bedroom below. Every breakable article in the room was smashed by the shock, and some clothing caught fire. The fluid descended to the room below, touching the gilt moulding to which the picture-frames were suspended. This moulding was burned along its whole length and the picture-frames destroyed; a plate-glass mirror in a sideboard was also broken to atoms before the lightning escaped from the room, which it finally did by bursting out the front wall, making a hole about 6 feet square. The whole of the front wall of the house was shaken out of the perpendicular, so much so that the joists resting in it were on the verge of falling. The rest of the house was cracked and shaken, and the whole place will have to be rebuilt. Another house near was struck at the same time but without any very serious results. At the village of St. Anne de Bellevue, near Montreal, a flash of lightning struck the telephone in the Clarendon Hotel. A tiny blue flame was seen to emerge from the telephone and jump across to a metallic frame hanging on the wall; the flame travelled along the four sides of the picture-frame, tearing off strips of metal in pieces, diagonally of about two inches long. Having completed the tour of the frame, the flame jumped back to the telephone and was conveyed to the earth by the ground-wire. Beyond the destruction of the telephone and picture-frame, no damage was done to the house.

The officials of the Patent office at Ottawa recently witnessed some experiments on a new "gas" which the patentee calls "aceylene" and by which he expects to eclipse all other lighting processes. Mr. Wilson, the inventor or discoverer, whichever it is proper to call him, generates the gas by pouring water on a substance he calls "carbine," of which lime is the principal component. The light

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emitted is excessively brilliant and as "carbine" can be manufactured for about twenty dollars a ton, it is calculated that the price of this gas for domestic purposes would be fifty cents a thousand feet.

It really seems that the answer to the question as to what is the best material for roadways in cities is as far off as ever. Millions have been spent in the last decade on various patents, each one as it was invented being thought to be the pavement of the future. The old macadam roads were torn up to make way for "block" pavements, a simple and apparently primitive system which consists of short lengths of tree trunks set around on the sub-soil without other preparation than that of levelling and grading. One season was sufficient to prove that nothing was so unsuitable. Continual repairs were needed — and after the frosts of winter, whole sections would be burst up and in the thaws of spring would take to floating. Then asphalt was tried, and for five years it certainly seemed as if the right thing had been found. There are, of course, many kinds of asphalt for roadways, but the one adopted in so many places, though costly seemed to meet the requirements of a good solid roadway. It appears now that five years is about all that can be expected of this material; unevenness appeared on the surfaces soon after completion and a second winter produced alarming cracks. There are a few streets which have been laid for eight or ten years, and I believe the patentees of one kind guaranteed their material for ten years and this seems to resist the tendencies to crack although the surface does not wear evenly. The vibrations of the electric-car tracks it seems impossible to overcome, and where a "toothing" of stone is laid between the rails and the asphalt the injury to the asphalt is more severe. A great drawback to asphalt paving is the white, gritty dust, most destructive to the materials exposed to view in the shops, and as certain patentees object to water being poured on the roads to keep down the dust, the conclusion is reached that perfection has not yet been attained. Another disadvantage is the great heat of these roadways, the refraction being very oppressive, and while they get heated up in the day when exposed to the sun they give out at night a heat that in still weather is more than trying. What are we going to do next? Shall we retrace our steps and adopt again the macadam roads, laid in the best manner, or is there some new method of treating the asphalt that will at last give satisfaction?

HEATING WITH THE OPEN FIREPLACE.

DURING the past winter, when the "cold wave" destroyed oranges and frosted trees, the inhabitants of Florida suffered severely with the cold. Those who went from the North, where houses were heated thoroughly by modern methods, found in the South, nothing to keep out the cold but the open fireplace. And in the severe weather this was of little use, for, the more fuel burned, the stronger were the cold draughts created and the colder were the floors and walls. This disastrous cold in the South renews the inquiry — In what degree of external temperature can one rely upon the open fireplace as a sole means of heating, the amount of fuel consumed being of no consideration?

In heating with the open fire, radiant heat is the only part that is realized. Of the total amount of heat developed in the grate about 10 per cent is received in the room. Some writers place the percentage at 12 per cent, while Putnam's experiments show but 6 and 8 per cent realized. With the modern construction of fireplace, with the projection of the breast and mantel into the room, about 10 per cent is secured.

This 10 per cent of the full amount of heat generated has the task of keeping the room heated to the required temperature, say 70° Fahrenheit. But with the open grate, not only is the loss of heat through walls and windows to be repaired (as is the case with radiated heat from the direct steam or hot-water system), but the amount of air drawn in by the grate must also be heated. This air enters in volume equal to the amount passing up the flue of the fireplace; and it comes directly or indirectly from out of doors. It is this draught of incoming air that limits the degree of cold in which the open fire is of value, as a degree is reached below which the amount of heat required to warm the incoming air is more than the fire can supply, and the room is chilled, rather than warmed by the blazing fire.

In finding this temperature, we will take as example an ordinary southern fireplace, 24″ wide, 30″ high and 12″ deep, with a flue 9″ x 9″, situated in a room 16′ x 14′ x 11′, the longest side being exposed. Wood is used as fuel, burning, say, ¾ of a cord a month. This amount develops about 215,400 thermal units per hour. The draught of the flue, of average height, will be 20,000 cubic feet per hour. As it takes .0192 thermal unit to heat one cubic foot of air one degree Fahrenheit, and as but 10 per cent of the full amount of heat is realized, one wood fire can heat the incoming stream about 56° Fahrenheit.

But besides heating the air, there must be compensation for the loss of heat through the exposed wall. This 176 square feet exposure will require approximately ⅛ as much heat as the incoming current — or ⅛ the total amount of heat. This leaves us 21,540 less 5,385 thermal units, or 16,155 thermal units for the incoming air — showing that this can be heated about 42°. That is, to have the temperature of the room 70°, the external temperature cannot be lower than 28°.

If the draught is secured from adjoining rooms, the result for the entire house will be the same, or even worse, as it means that an open fire in some other part of the building has not only its own current to heat, but also that of the fireplace in question.

Variations in size, shape and projection of fireplace will give slightly different results, as will also a change in the flue itself. The draught varies also with external temperature (being stronger when the thermometer is lower) but general results are as shown. The freezing-point is, then, about the limit at which the open wood fire gives satisfactory heat. Coal gives better results, as the draught is less in proportion to the amount of heat thrown into the room. Patent grates also give far better results with wood, as they decrease, and in some cases entirely stop, the inflow of cold air.

There may be secured a fireplace that burns wood to better advantage, the draughts being decreased by using a smaller flue, but it is found that the fireplace will often smoke when the opening is partially closed.

If more than ¾ cord of wood be burned per month, the results are practically the same, as the draught is increased nearly in proportion to the heat generated, and a far larger percentage of heat is lost up the flue because of the rapid exhaust of the hot gases.

Nor can the draughts be checked by closing crevices through which the outdoor air enters, as in that case the fire cannot burn at all. In fact, there is a gain in heat when an opening from the outside is made directly in front of the fireplaces. These results vary so much, that this sketch is intended more to suggest, than to give definite data.

WILL WALTER JACKSON.

DANGEROUS STATE OF SALISBURY TOWER.

THE following is Sir Arthur Blomfield's report on the serious condition of Salisbury spire, or (to speak more correctly) of Salisbury tower, for, as will be seen by the report, the real failure is in the masonry of the tower; the spire, in itself, we believe, is in good condition, but the collapse of the tower would involve the ruin of the spire, the thrust of which is also partly the source of the danger. The report was communicated by the Dean of Salisbury to the London *Times* and has no doubt been seen by many of our readers, but it will be well to put it on record in our columns for future reference: —

"SALISBURY CATHEDRAL, June 29.

"During the progress of certain minor repairs in the central tower it became evident that something was seriously amiss with the upper part of the two western stair turrets which required investigation.

"A scaffold was accordingly erected round the northwest turret, from which a close and careful examination has been made, with the result that its state proves to be even worse than was feared.

"A good deal of the external stonework is split and fractured and is in so loose and unsafe a condition that no assurance can be given of security from some serious disaster which might at any time occur. Certain cracks which are observable internally, especially one in the base of the spire at this angle, though they are certainly not altogether new, show indications of a slight recent movement which would inevitably become dangerously aggravated by any considerable fall of portions of the external stonework.

"It is difficult to determine with certainty the precise cause of the present state of things in these turrets, but various adverse agencies have no doubt been gradually at work for many years past.

"Of these the principal are, first, the numerous iron bands, rods and ties, which have been introduced from time to time, many of them in the most injudicious manner.

"An attempt has been made to protect some of them with lead from wet and consequent corrosion, but this has in many places altogether failed and made matters worse rather than better. The next agents are wet and frost, which have gradually done much damage; and the third is to be found in the great thrust of the spire, which is continually active.

"Nothing can be done to lessen or modify this last element of danger, but it is imperative to render the angle-turrets, which receive so much of it, as sound and strong as they can be made.

"For this purpose any attempt at small repairs or patching would not only be useless, but positively dangerous. The work that is called for by the necessities of the case is emphatically not one of restoration, but of repair, which is absolutely essential for safety, and which to be effectual must be complete and thorough.

"The greatest care, caution and skill will be necessary in dealing with the damaged portions of both these turrets.

"I should recommend the completion of the northwest turret first, to be followed immediately by the repair of the corresponding one on the south side.

"It is impossible to give any accurate estimate of the cost of the work necessary to put these turrets in a sound and satisfactory state, but it will probably amount to about 5,000*l*.

"ARTHUR W. BLOMFIELD, *A. R. A.*"

The subject is likely to be of so much interest to our readers, and the problem of dealing with the weak angles of a tower with such a great superincumbent weight on it is such an awkward one, that Sir Arthur Blomfield has been asked if he can give any information as to the means it is proposed to adopt to put the tower in a state of security. He has replied in the following letter: —

"*Dear Sir*,— Referring to your inquiries as to my report on the state of the western angle-turrets of the central tower and spire of Salisbury

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Cathedral, a point has not yet been reached when a detailed description of the *modus operandi* is possible.

"The present scaffolding was only erected to provide a means of closer examination than was possible in any other way at certain points, and it is quite sufficient for that purpose; but before anything more can be done, or the precise means of dealing with a difficult and complicated undertaking can be decided, this scaffold must be supplemented and made strong enough to receive such shoring, strutting and needling as may be found necessary. This preliminary will be the first thing which will occupy my attention.

"With regard to subsequent proceedings, all I can say with certainty at present is, that my endeavor will be to avoid the use of iron altogether.

"Wherever I find it possible I hope to remove the bars and plates which have done so much mischief in the past, and in future to rely on bonders and bonding courses of stone, which, if properly used and well joggled and dowelled, are in every way much more satisfactory and reliable.

"You will, of course, understand that I do not refer to the great iron ties and bands of the tower below, but to numerous small rods, bands and plates which I believe to have been introduced in the upper part of the angle-turrets in the time of Bishop Sherlock, that is, about one hundred and fifty years ago.

"Faithfully yours, Arthur W. Blomfield."

WALL TILES IN THE AZORES.

I DID not go to Ponta Delgada for the purpose of making art studies. Naturally enough, perhaps, I had never connected the Azores with art, and I went there, indeed, in the hope — if I may be pardoned the expression — of escaping it for a time. But I could not.

The interior decoration of the churches, which is the only art manifestation likely to be seen by the general tourist, does not, at first sight, offer anything remarkable. The general effect produced is that of tawdryness — much inharmonious coloring, much gilding, paper flowers, sometimes in profusion, disposed around the altars, etc. The pictures, which, of course, are the principal things a stranger looks for, are also, as a rule, mediocre and less than mediocre. But upon closer investigation one finds, after all, a good many things to interest one. First of all, there are the tiles, sometimes to be seen on the outer walls of the churches, but very generally on the inner walls, — some few said to be of old origin, like those of the Mai de Deus; most of them, however, probably of the eighteenth century, but nevertheless interesting, and often not merely ornamental, but representing vast landscapes with groups of figures in them, as a rule in simple blue and white, but sometimes with ornamental borders into which yellow and violet have been introduced. The most interesting tiles of this kind which I noted are those in the main chapel of S. Francisco, at Ponta Delgada: on the northern wall the birth of the saint, on the south wall his stigmatization, both with landscape backgrounds of considerable importance. Very interesting also is an octagon chapel in the same church, entirely lined with tiles said to be of Italian origin: in the dado the entombment and the tomb of Christ, on the walls the four evangelists and four angels with the instruments of the Passion, over the door Moses and the brazen serpent. A dado of similar tiles is to be seen in the sacristy of the Matriz, curious especially for its subjects, which are representations of hunting-scenes, said to be of Portuguese origin. Unfortunately, many of these things are going to ruin, especially those in the extinct convents, and the churches belonging to them, which have been assigned to other uses. Thus the barracks of the sharpshooters quartered here are in an old convent, to which is attached a church, now disused, dedicated to St. John. The decorative tiles from this church have been used in part in the quarters of the soldiers, the others, by order of Captain Chaves, who is one of the few people who care for such things, have been stored away. I obtained a few of these tiles, decorative, blue and yellow on a white ground, Portuguese of the beginning of the eighteenth century, which the Museum of Fine Arts can have, if it wants them.

Another feature in the churches is the carving in the altar-niches, perfect forests of ornamental leafage, here and there with angels or the heads of cherubim peeping out of it. It is to be regretted that these niches are mostly painted and gilded, which produces an unpleasant want of repose. The effect is better where gilding only has been employed. But the work of this kind can best be appreciated in the "Collegio" of the Jesuits, which contains not only the most elaborately carved, but also the largest of these niches. In this case, the church not having been finished when the Jesuits were expelled, the wood is still in its native state, only mellowed by age, thus presenting a warmth and a unity of effect which is entirely wanting in the painted and gilded examples. The church and convent are at present private property, and one of the members of the family owning them told me that they had intended to have the niche finished, that is to say, gilded and painted, but that some French gentlemen who had seen it, had strongly advised against this proceeding — a piece of advice which I heartily seconded.

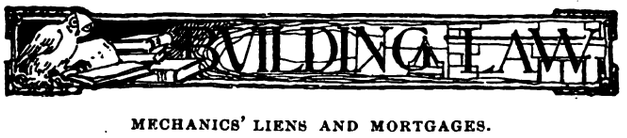
Many of the painted statues and statuettes, forming either the principal features of the altars, or disposed at the sides, are also quite attractive and worthy of attention. Some of these are said to be of Italian origin, while others are Portuguese. A colored bas-relief of "The Death of St. Joseph," in the church of Sta. Barbara, is especially remarkable for its delicacy and sweetness. — *S. R. Koehler in the Boston Transcript.*

THE MECHANICAL TESTING-STATION AT CHARLOTTENBURG.

EVERYBODY has heard of the "Physikalisch-Technische Reichsanstatt," generally called Reichsanstatt simply, at Charlottenburg, near Berlin, to a certain extent the realization of Professor O. Lodge's desideratum of a national laboratory. The Reichsanstatt is popular amongst the manufacturers and purchasers of technical apparatus and articles, because they can have the articles tested by competent and impartial men at moderate charges. And it is held in high esteem by men of science, because there experiments can be carried on which may require a lifetime, the coöperation of several investigators, and the continued use of costly apparatus. An official testing-station is now to be found in every larger German town, in connection with its university or technical college. Some towns can boast of more than one technical college, and of more than one testing-station. Thus, Charlottenburg and Berlin possess, in addition to the Reichsanstatt, where Professor Fr. Kohlrausch has succeeded the great Helmholtz as president, and besides other institutions of this class, the Mechanisch Technische Versuchs-Anstatt, which has for some time been directed by Professor A. Martens.

This last institution is divided into four departments, each with its chief, all of which appear to be amply supplied with the requisite machinery and apparatus. The first department is devoted to the testing of metals, ropes, belts and also wood. The test-pieces which are not generally received of exact dimensions, can be prepared in the laboratories, their various strengths ascertained; they can be punched, planed, crushed, welded, cast, alloyed, etched in acid baths, microscopically examined and photographed, and polished sections or slices tested in reflected and transmitted light. For these latter purposes a micro-photographic apparatus has been designed and constructed by Professor Martens and Mr. Carl Zeiss, of Jena. Special arrangements have been made for long-continued and repeated bendings, stretchings, etc., of discs, wires, cables. In some tests, specimens of over 50 ft. length and 30 in. width can be dealt with; polished surfaces can be made in areas of several square feet. In the second department, building-materials are examined, natural and artificial stones, glass, wood, roof felting (a kind of paper is used in Germany as such), lime, cement, mortars, plasters and drain-pipes. There are appliances for continued heating and freezing, treating in the wet, and other means of imitating the effects of ordinary wear and tear. The question of cement-testing has long been recognized as one of public interest in Germany, and for some years already this mechanical testing-station at Charlottenburg has been acknowledged as the final arbitration court by the Government. For a complete cement test two tons of the material are required; weights of less than 20 lb. are not accepted even for ordinary experiments. The third department, shortly known as the paper department, inquires into paper, cardboard, canvas, tarpaulin, threads and textile fibres in general. It is particularly requested that specimens of paper should be packed between thick covers of cardboard in order to avoid creases and the pressure of the postal-mark. The fourth department deals with lubricants: Professor Martens is an authority on such matters.

All these testing-stations are under the superintendance of a Government board. Pamphlets are issued stating the way in which specimens should be selected, handled, packed, etc. They also give a summary of the various tests in use, and the charges made for these. The Charlottenburg list of tests comprises 419 numbers. Clients have to say, when submitting their specimens, what they wish to be done. If in doubt about the best way in which to obtain their aims, they are advised to communicate with the director. By request, experiments are conducted on the special lines desired; the certificate issued in such a case contains a notification to this effect. Prepayment is the general rule. For investigations which will occupy a long time a deposit is demanded, and a discount varying from 10 to 20 per cent allowed. The same facilites are offered to firms which frequently consult the testing-station. The chemical laboratory in the Invalidenstrasse, Berlin, which is connected with the Mining Academy of Berlin, makes a speciality of ink and fuel testing, besides undertaking general analyses, more particularly of inorganic substances. Since 1883 the supervision board of the Prussian testing-stations has published "*Mittheilungen*," on the work done and the experience gained. These journals contain valuable information, and the apparatus which are originated in these laboratories can be freely copied. — *Engineering.*



MECHANICS' LIENS AND MORTGAGES.

A PARTY taking a mortgage on real estate is bound at the time to know whether material has been furnished or labor performed in the erection, reparation, or removal of improvements on the premises with the time fixed by statute for the filing of liens to perfect laborers', contractors' and material-men's claims for such liens.

The lien of a mortgagee on real estate, taken while a building is in process of erection upon it, is subject to the claims of material-men and laborers for material already and thereafter furnished, and for

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labor already and thereafter performed in the erection of such building, when the commencement of such furnishing of material or the commencement of the performance of such labor was prior to the record of such mortgage.

The taking of a mortgage upon the same property upon which the creditor claims a statutory lien may not displace the lien. The mortgage is regarded as a cumulative security, and the creditor may enforce either the lien or the mortgage. So also, the taking of collateral obligation of another person for the payment of the lien debt does not debar the lien-holder from claiming the security of his lien, unless the circumstances are such that an intention to waive the lien may be reasonably inferred.

We are aware that it has been held that, if the party take a mortgage upon the same property upon which the statutory lien is claimed, it is a waiver of the lien, or if it has been perfected by filing, etc., will displace it. But in the decisions in which the rule is so announced, the reason given or shown by the facts of the case for the doctrine was that other lien-holders had become such by relying upon the record as showing the relations of the other parties, and to permit the mechanic or material-man who had taken the mortgage to assert the right to the statutory lien would prejudice the rights so acquired.

It is a general principle of law that a creditor may have as many securities for his debt as he can obtain without infringing upon the rights of others, and the rights of others cannot be affected by the fact that a party claims also a vendor's lien for material or machinery supplied for use of a building, as well as a mechanic's lien for the same debt.

[Chapman *vs.* Brewer (Supreme Ct. Neb.), 62 *N. W. Rep.* 320.]

MECHANICS' LIEN IN NEW YORK.

UNDER the laws of New York, 1885, Chapt. 342, Sect. 5, providing that mechanics' liens shall be preferred to any conveyance, judgment, or other claim which was not docketed or recorded at the time of filing the notice of lien, a lien filed after the death of the owner for work done before his death does not attach to the interest of the owner's devisees.

The Court said: No provision is found in the statute giving the claimant the right to acquire a lien after the death of the owner. Mechanics' liens are created by statute, and while the law should receive a liberal construction, so as to secure the beneficial purpose had in view by the Legislature, yet, as it creates a remedy unknown to the common law, it may not be extended to cases not fairly within the general scope and purview of the statute.

[Turbridy *vs.* Wright (Ct. of Appeals), 39 *N. E. Rep.* 640.]

MECHANICS' LIENS.

WHERE it appeared, in an action to foreclose a lien on property owned by husband and wife, that the title was in the name of the husband only, and that knowledge of the fact that he had a wife was not brought home to the lien-holder, it was not error to render judgment to the latter, although the notice omitted the name of the wife.

[Wash. Rock-Plaster Co. *vs.* Johnson (Supreme Ct. Wash.), 39 *Pacific Rep.* 115.]

SUFFICIENCY OF NOTICE OF LIEN.

As against the owner of property upon which a building has been erected, a lien notice sufficiently alleges ownership although it erroneously states that he has an equitable title, and that the legal title is in some one else.

A description of the property, as a certain brick building, giving the dimensions, etc., located on such a street, describing the lot, in a certain city, etc., is sufficient, although it is not in the "addition" named.

[McHugh *vs.* Slack (Supreme Ct. Wash.), 39 *Pacific Rep.* 674.]

ENFORCEMENT OF MECHANIC'S LIEN.

WHERE the purchaser of land on which there is a mechanic's lien agrees to pay it off and save his grantor harmless as to same, the lien may be enforced against the land in the hands of the purchaser, without first exhausting the lienor's remedy against the grantor.

[Cullers *vs.* First National Bank (Ct. Civ. App. Tex.), 29 *S. W. Rep.* 72.]

KNOWLEDGE NOT CONTRACT NECESSARY TO A LIEN.

THE Common Pleas Court of New York City holds that where work is done and materials furnished for a building with the knowledge and consent of the owner, a lien may be obtained for same, although the party claiming it made no contract with the owner.

[Marshall *vs.* Cohen, 32 *N. Y. S. Rep.* 283.]

NECESSARY PARTIES TO ESTABLISH LIEN.

IN an action by a laborer employed by a sub-contractor to enforce a mechanic's lien, the contractor, if service can be had on him, is a necessary party.

[Union Pac. Ry. Co. *vs.* Davidson (Supreme Ct. Colo.), 39 *Pacific Rep.* 1095.]

PRIORITIES OF MECHANIC'S LIEN.

UPON a full compliance with the statutory requirements, the lien of one who furnishes materials for the erection of a dwelling-house upon land previously mortgaged attaches to such building in preference to the mortgage, and under proceedings to enforce such lien, the purchaser of the building at foreclosure sale may remove the same within a reasonable time thereafter.

[Laird-Norton Co. *vs.* Herker (Supreme Ct. So. Dak.), 62 *N. W. Rep.* 104.]

EQUITABLE LIEN FOR BUILDING MATERIALS.

A CONTRACT for the purchase of materials to be used in the construction of a house, and notes given for the price, reserving title in the seller until payment, who is thus deprived of a lien under the statute, and also cut off from an action at law — until the notes are due, creates an equitable lien on the house and lot which may be enforced in a court of equity.

[Rose *vs.* Perry (Supreme Ct. Ala.), 16 *So. Rep.* 915.]

MECHANICS' LIENS — UNUSED MATERIALS.

THE title of building contractors to materials left on the premises on their abandoning the contract, because of the owner's breach, is not divested by a judgment in their favor assuming to give them a lien on such materials in an action in which, though they asserted a lien, they did not claim judgment for the price of such materials, but only for damages for the loss they were put to in purchasing them. As it belongs to them it could not be subject to a lien by their judgment.

[Porter & Blair Hdrw. Co. *vs.* Lee (Supreme Ct. Ala.), 17 *S. Rep.* 217.]

RIGHT TO MECHANIC'S LIEN FOR IMPROVEMENTS.

WHERE a lease provides that the lessee may, at his own expense, alter and repair the building, one who makes the alterations under a contract with the lessee does the work "with the consent of the owner," within the statute providing who may acquire a mechanic's lien. Where improvements become part of a building, the fact that they were designed especially for the tenants' business will not affect the right of the person doing the work to a mechanic's lien. A provision in a lease that the lessee may repair and alter the building, does not give him the right to build a new sidewalk, so as to entitle one who, under contract with the lessee, builds the sidewalk, to acquire a mechanic's lien on the leased land.

[Mosher *vs.* Lewis (Common Pleas of N. Y. City and County, General Term), 31 *N. Y. Sup. Rep.* 433.]

RIGHTS OF SUB-CONTRACTORS TO LIEN.

SUB-CONTRACTORS being unable to complete their contract wrote the contractors a letter authorizing them to take charge of the work and "complete the same for our account" and that "we do not waive by this our rights under the original contract, for any extra work accruing from same." The Supreme Court, 2d Department of New York, held that the contractors by proceeding with the work, only assumed to finish it for the sub-contractors, and on completion, the cost was to be deducted from the contract price, before anything would become due to the sub-contractors to which a lien would attach.

[Brainard *vs.* Kings County, 32 *N. Y. S. Rep.* 311.]

ORDER BY CONTRACTOR AND MECHANIC'S LIENS.

AFTER a contractor had given a sub-contractor an order on the owner, he abandoned the contract, and the owner completed the building under a clause authorizing him to do so in default of the contractor, and to deduct the cost of completion from any moneys due the contractor. The order had been presented prior to the filing of any liens. And the Supreme Court, 1st Department of New York, held that such order was an assignment for so much of the balance due the contractor, after deducting for cost of completion, and was entitled to a preference over liens not filed until after its presentment.

[Murray *vs.* Micolino, 31 *N. Y. S. Rep.* 1109.]

FRAUD MAY PREVENT A LIEN FOR BALANCE OF CONTRACT PRICE.

WHERE a company agreed to build a factory for a certain sum, and a number of parties severally agreed to pay the amounts they individually subscribed, and some of them did so; but it appeared that those who had not paid their supposed subscriptions, either never signed the contract at all, or signed a piece of blank paper under fraudulent representations, so that they never became parties to it, the Supreme Court of Wisconsin held that the construction company was not entitled to a lien for the unpaid balance of the contract price.

[D. & R. Bldg. & Mfg. Co. *vs.* Cupp, 62 *N. W. Rep.* 520.]

SURETY ON CONTRACTOR'S BOND — RIGHT TO LIEN.

A SURETY on a contractor's bond to secure the owner against the

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enforcement of liens cannot enforce against such owner, a lien growing out of his principal's contract.

[Spears *vs.* Lawrence (Supreme Ct. Wash.), 38 *Pac. Rep.* 1049.]

MECHANIC'S LIEN — BOND OF OWNER.

A BOND given by the owner of buildings upon which a notice of lien for materials and labor has been filed, conditioned for the payment of any judgment that may be rendered against the property, (as provided by the laws of New York, and some other States) takes the place of the property, and discharges and becomes the subject of the lien; and an action is maintainable upon the bond against all parties interested, including the sureties, without first foreclosing the lien upon the property.

[Morton *vs.* Tucker (Ct. App. N. Y.), 40 *N. E. Rep.* 3.]

HOMESTEAD SUBJECT TO MECHANIC'S LIEN.

A CONSTITUTIONAL provision that a homestead shall be liable for work and material used in improvements upon it, renders it liable to one who agreed to make the improvements, and made a contract with another party to actually do the work. A lien on a homestead for labor and materials for improvements may, also, be created by express contract.

[Walters *vs.* Texas B. & L. Ass'n (Ct. Civ. App. Tex.), 29 *S. W. Rep.* 51.]

MECHANIC'S LIEN FOR BUILDING ON LEASED LAND.

WHERE a contract to lease provides that the lessee shall erect a building on the premises, the lessor agreeing to pay the costs of such building by permitting him to retain the rents, the lessee erects the building as the agent of the lessor, so as to subject the interest of the lessor in the land to a mechanic's lien for labor and material furnished in the construction of such building.

[Kremer *vs.* Walton (Supreme Ct. Wash.), 39 *Pac. Rep.* 374.]

IDENTITY OF BUILDING UNDER MECHANIC'S CLAIM FOR LIEN.

A LIEN claim for material furnished for "a one-story refrigerating machine building and boiler house" is not at variance with proof that there were two buildings on the ground, where it is shown that they were so substantially connected as to make but one building, and that there could be no mistake as to the identity of the structure.

[Peterman *vs.* Mil. Brewing Co. (Supreme Ct. Wash.), 39 *Pac. Rep.* 452.]

PROPOSED FIREPROOFING TESTS.

THE important subject of the practical value of fireproofing is about to be investigated in a scientific manner by a committee appointed for that purpose; and it is expected that the results obtained will prove a valuable addition to our present knowledge.

Until now, all tests made have been undertaken in a more or less contracted manner, and, in most cases, simply to determine some special result. It is now proposed to carry out experiments on a large scale, and, among other things, to test the effect of an intense fire on the structural iron and steel so universally employed at the present time, and the effect that the different fireproofing materials may have in protecting the same.

The committee has been jointly selected by the fire-insurance companies, the architects and the engineers, and consists of Mr. S. A. Reed, representing the Tariff Association of New York; Mr. George L. Heins, the Architectural League of New York; and Messrs. H. de B. Parsons and Thomas F. Rowland, Jr., the American Society of Mechanical Engineers.

It may be stated in advance that the report of the committee is expected to contain some very valuable information. It is, therefore, hoped that not only the manufacturers of fireproofing materials, but also the public in general will offer their assistance, as the committee's expenses are to be met entirely by voluntary contributions.

The manufacturers of fireproofing materials are, however, not allowed to subscribe, but are asked simply to defray the expenses of erecting and removing their materials to be tested.

The Carnegie Steel Company, through their agent, Mr. Whitney, have kindly offered to give the committee all the iron and steel that may be required, and the Continental Iron Works have consented to give the ground necessary for the erection of the furnaces.

The time of the members of the committee is freely given to the advancement of scientific knowledge, and their names are sufficient to insure thoroughly impartial tests.

The committee has organized, and has commenced to build the required plant. There will be a gas-producer to supply the fuel-gas, so arranged to receive a spray of petroleum in case higher temperatures may be required than those obtained from the combustion of the gas alone.

Furnaces for testing full-sized columns and floors will be erected. The foundations of these furnaces will consist of side walls with an arch between them, thus making a safe place for the introduction of the gas-pipes and for the hydraulic cylinder. On the top of this foundation will be erected a room built of the materials to be tested. The columns will be loaded by pressure from the hydraulic cylinder, and, during the tests, a safe load, such as is prescribed by the building-laws of this city, will be put upon it. The arches for the floors will be loaded by dead weight. Every precaution will be taken by the committee to make the tests uniform as regards temperature, draught, cooling by water-streams, etc., so that the results may be comparable.

The committee will take minute notes of all details and publish them, together with the results, in its final report. The committee would be pleased to communicate with any one who may be interested in this matter. Its address is The Committee on Fireproofing Tests, Room 104, 22 William St., New York.

SOCIETIES

THE ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE Committee having in charge the arrangements for the Twenty-ninth Annual Convention of the American Institute of Architects to be held in this city on October 15th, 16th and 17th next, has finally agreed upon the following programme:

HEADQUARTERS AT ST. NICHOLAS HOTEL.

Tuesday, October 15th. — Sessions in the forenoon and afternoon.

Lunch at the hotel as guests of the St. Louis Chapter.

In the evening, formal reception at Museum of Fine Arts as guests of the St. Louis Architectural Club. Address of welcome by the Mayor of the city.

Wednesday, October 16th. — Session in the forenoon.

Lunch at hotel as guests of the St. Louis Chapter.

In the afternoon, carriage-drive through the residence portion of the city and the parks, and on the return, luncheon at the Columbian Club or Steam-boat excursion on the river.

In the evening, "Smoker" at the Mercantile Club.

Thursday, October 17th. — Session in the forenoon.

Lunch at hotel as guests of the St. Louis Chapter.

In the afternoon, visit to Anheuser-Busch Brewery, or prominent buildings in course of erection, or completed.

In the evening, theatre or Exposition.

A. F. ROSENHEIM,
Secretary and Chairman.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE STATE LIBRARY: EXTENSION OF THE MASSACHUSETTS STATE-HOUSE, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

A COMPETITIVE DESIGN FOR THE MINNESOTA STATE-HOUSE SUBMITTED IN THE FIRST COMPETITION BY MESSRS. C. W. & A. A. STOUGHTON, ARCHITECTS, NEW YORK, N. Y.

ALUMNI HALL: DARTMOUTH COLLEGE, HANOVER, N. H. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

BUTTERFIELD MUSEUM: DARTMOUTH COLLEGE, HANOVER, N. H. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

REPRESENTATIVE CHAMBER: EXTENSION OF THE MASSACHUSETTS STATE-HOUSE, BOSTON, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

[Gelatine Print.]

DALY'S THEATRE, CRANBOURNE STREET, LONDON, ENG. MR. SPENCER CHADWICK, ARCHITECT.

CENTRAL BAY, NORTH SIDE OF CHOIR, ST. SAVIOR'S CHURCH, SOUTHWARK, ENG.

FOUR HOUSES AT HARROW, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

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COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

EARLY BOSTON BUILDING.

SWAMPSCOTT, MASS., August 19, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — You are right in praising the Boston building-law of 1679, passed in consequence of the great fire, which, on the 8th of August in the year named, destroyed seventy business buildings and eighty dwellings about State Street and Dock Square. But the first building-law applicable to Boston was passed in 1631, when in consequence of the first fire, at the South End, the use of all wood in the construction of chimneys and the use of all thatch for roofs was prohibited, which prohibition, we are told, was "readily assented to." Moreover, there is ample evidence to show that the law was duly enforced, aside from the fact that New England Puritans were not in the habit of using language in vain. As chimneys were well constructed, householders cleaned them occasionally by firing. This was prohibited in 1651, the selectmen being given full authority in the premises. In 1654 the town ordered Joseph Jenks, the famous inventor of the mowing machine, to build the first fire-engine in America. The building-law of 1631 justifies the belief that Colonial Boston had no thatch roofs, except those built before the town was six months old; and that the First Church, on the site of the present Brazer Building in State Street, had a roof of cedar shingles. It was certainly a substantial building, accommodating the congregation, the town-meeting, the law courts and the General Court. It was given up in 1639, I think, because more room was required for separate offices, the public records and for storage. When this first meeting-house was built, in August, 1632, the people knew that Boston would live; in 1639, they knew that Boston was the commercial metropolis of America, whose merchants had a world-wide reputation for ability and honesty. Their credit was nowhere questioned. All the world knew that in Boston, a town somewhere in America, men kept their engagements, being the only community where public and private opinion, the government and the governed were united in treating every trade and every transaction between man and man as involving three parties, — the buyer, who could rely on Puritan Boston; the seller, who scorned the rule of *caveat emptor* as infamous; and the living God, whose moral and commercial law was considered sure and swift as the law of gravitation. This spirit of Puritan Boston formed an epoch in commercial history. It was known in the West Indies, in Spain, in Holland, in London. It controlled every bit of building, engineering, or architecture in Colonial Boston — the only period in our history that treated all shams and all pretences as a violation of Divine law. Boston declined in the Province period, which controlled the eighteenth century.

Very truly yours, C. W. ERNST.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

THE VALUE OF CITY QUIETUDE. — A railway company running into London, and establishing a new station at St. John's Wood, broke up the home of Jerome K. Jerome. He employed counsel and sued the Company for depriving him of a congenial haunt for a man of genius. The case was worked up well, W. S. Gilbert, I. Zangwill, Sidney Grundy, Frankfort Moore and other literary men being produced as expert witnesses to prove that Jerome's house was removed from the hurly-burly of German bands and hand-organs, and singularly well adapted for literary labor, and that such places were not easily found in London. The jury awarded Mr. Jerome a compensation of £500 for what might be considered sentimental damages in being compelled to give up the tenancy of a house where he had absolute privacy. The Company ought to have summoned M. Daudet to testify to the "silence of London." — *Philadelphia Telegraph.*

HOUSE-BUILDING BY CO-OPERATION. — A novel coöperation system has lately been started among the carpenters and painters of San Francisco, through which the individual workmen are becoming owners of homes of their own without any cost of construction. As soon as any member of the local organization has saved enough money to buy a lot and the necessary lumber, all his fellow-workmen turn to the next Sunday and build the house for him. In one of the suburban additions of the city a little colony of these "Sunday homes" has already grown up. The houses are not pretentious, but are solidly built and comfortable. — *Chicago Chronicle.*

TELEPHONES HURTING HOTEL BUSINESS. — One of the latest discoveries in connection with the development and extension of the telephone business is the effect which it has had upon the hotel business, and, consequently, upon railroad business. It is no doubt true that much of the business that formerly required a trip to New York or Boston by Chicago business-men is now transacted by means of the long-distance telephone. The rule works both ways. An observer of Chicago hotel business ascribes much of the dulness in the rotundas to this cause, and many of the hotel managers and clerks are disposed to believe that the theory is not only plausible, but founded upon stubborn fact. — *Chicago Western Electrician.*

A WARWICKSHIRE EPITAPH. — It is a mistake to leave one's epitaph to be written by bereaved and sorrowing friends. Far safer it is to prepare something appropriate and grammatical, and append it to the last will and testament. Mental distress is inimical to good literary style, albeit conductive to unconscious and incongruous humor. In proof of this, one has but to visit a little churchyard in Warwickshire, where the remains of a highly respected country Squire lie interred. The inscription on the tombstone informs the passer-by that the deceased was "accid-ntally shot by his gamekeeper," and includes the ambiguous addition, "Well done, thou good and faithful servant." — *London Daily Telegraph.*

PRIZES FOR TRADE ESSAYS. — Our Paris correspondence says that the Comte de Chambrun, who has founded and liberally endowed the Social Museum, has just offered two prizes of £1,000 each, open to persons of every nationality, for two essays on profit-sharing and trades unions. The topics to be treated are: in one case, origin of profit-sharing by workmen and employés; present state of the question; results obtained; research of the best practical means of application, advantages of profit-sharing with reference to relations between employers and employed, and to the fair remuneration of capital and labor. In the other case the topics are the different services that town and country laborers can derive from association in its different forms, friendly societies, masters', workingmen's and mixed unions, industrial and coöperative societies of consumption and production, and construction of coöperative loan and savings banks. Memoirs written in French must be delivered at the seat of the Société des Etudes Sociales, 5 Rue Lascases, Paris, before Dec. 31, 1896, for the essays on profit-sharing, and before Dec. 31, 1897, for the essays on unions. — *London Daily Telegraph.*

THE DEMERITS OF THE STEEL NAIL. — Perhaps it is as well for the manufacturer of the steel nail that so few people are conversant with the worthlessness of that article where any part of it is exposed to the weather. Attention has already been called to the fact in the columns of this paper that the steel nail as a shingle nail is a complete failure. The average retail dealer cares little about this fact any more than to know it for his own satisfaction. He only reasons that if the nails do not last there will be more demand for shingles. He may sometimes want to use this knowledge to combat the assertion of some one who says that there is an acid in the shingle he is making a run on that eats the nail. I have found places where the red cedar and the redwood shingle have been condemned on this account, and other places where the hemlock shingle had been frowned on for the same cause. One reason the dealer should know this is that he sometimes has a roof of his own to shingle; and it is possible that an occasional dealer may be found who feels as though it is his duty to tell his customers what he has read in the *Northwestern Lumberman* on this subject. I have spent considerable time on this question, both before and since writing my other articles and the result of my investigations are as follows: The life of the steel nail (when used for shingling) under the most favorable circumstances is not more than six or seven years, and the length of time ranges from that down to five, four and three years in sections where large amounts of soft coal are burned, or when, through any cause, a large amount of sulphuric acid was in the air. The results from the nail being exposed to the sea air are even more disastrous, as I have been told that on the Atlantic coast the steel nail has given place to the nail of copper, the life of the former being only about 18 months. I am well aware many carpenters will tell you this is not a fact, simply because they are wedded to the wire nail, it being the easiest to drive. They will call your attention to the fact that the old iron nail would break very easily, while the steel nail bends and will not break; but they do not tell you that the steel nail will rust and corrode and scale off, until in a short time there is nothing left of it, and that the old iron nail would outlast any shingle. There will be more trouble each year about shingles blowing off as long as steel nails are used. I am often surprised that dealers will persist in using them after these facts have been laid before them, and when a test can be made so easily. Take a handful of steel nails and drop them on the ground where they will gather dampness, and in one night they will be found to have rusted, and will be more or less stuck together; and don't forget that the most of the nails used to-day, either wire or cut, are made of steel. The use of the steel nail has been one of the greatest drawbacks to the red cedar-shingle business in the east, on account of the story so often told of an acid in the wood that eats the nail. Of course, this story was made out of whole cloth, as the saying goes, but it has had more or less effect, just the same. — *Benj. F. Cobb in the Northwestern Lumberman.*

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Bartram's Garden Gate.—Among the valuable collection of old photographs owned by the Fairmount Park Commission is one of the entrance to Bartram's Gardens which has a curious and authentic history. A few years after the buildings were destroyed a vigorous search was made for photographs, but the few that had been taken were completely lost, and the plates had been broken. On one of his voyages to the Orient a Philadelphia sailor discovered a photograph in a Japanese shop which he recognized instantly as Bartram's famous garden gate. It was brought here and its authenticity established by several old inhabitants, so that the Park Commission now holds probably the only photograph of the sort extant. — *Philadelphia Record.*

The Salvation of St. Sophia.—On the morrow, at the first capture of the city, the jannissaries rushed to the great church, which they conceived was filled with gold, silver and precious stones. They found the doors fastened, but broke them open, and at once began to pillage. The Sultan, as soon as possible, rode to St. Sophia. Dismounting on the threshold, he stooped down, and collecting some earth, let it fall on his turbaned head as an act of humiliation. Then he entered the edifice, but stopped in the doorway some moments and gazed in silence around him. He saw a Turk breaking the floor with an axe. "Wherefore dost thou do that?" inquired the conqueror. "For the faith," replied the soldier. Mohammed, in an impulse of anger, struck him, saying, "Ye have got enough by pillage and enslaving the city, the buildings are mine." — "*The Church of St. Sophia,*" *Lethaby and Swainson.*

Cowled Fox and Cock.—At Christchurch Priory, Hants, we may see many examples of sculpturesque humor, illustrative of fables and monkish legends, mostly taken from the Bestiaries of the Middle Ages. The question is, were they intentionally humorous, and therefore satiric; or were they merely the expression of a naïve simplicity, such as we find sometimes in the drawings of children? And was the comedy a part of the artist's scheme, or is humor, as distinct from buffoonery, a modern sense and a creation of modern times? Take, for instance, the well-known carving at Christchurch of a cowled fox preaching from a pulpit, with a small cock at his side. May not this be symbolic of the enemy, that old fox, vesting himself in the disguise of a holy monk in order to deceive the very elect, but prevented from so doing by the warning voice of the cock? Is not this a more probable reading than the idea that a monkish sculptor would venture to satirize his fellows by depicting them as foxes in the religious habit? And may not the hog preaching to a flock of geese, symbolize the folly of the multitude in not discovering the enemy through the disguise of a cowl. — *Good Words.*

A Mine on Fire over Forty Years.—The Commissioners appointed by the Local Government to inquire into the "history, causes, and effect" of the coal-mine fires of Pictou County have just finished taking evidence. The Commission is composed of Inspector Gilpin, Deputy-Inspector W. Madden, Henry Mitchell and A. Dick. The work of the Commission was directed mainly to an investigation of the condition of the Foord pit. This mine has been on fire in one place or another since the fifties, and it is burning yet. Explosion after explosion has occurred, and many lives have been lost. When fire broke out in one place the miners resorted to another, sinking a new shaft. To avoid the fire on an upper level, a shaft was sunk and coal taken out on the level immediately below the fire. Soon the fire came through, and again the miners were driven out. Nothing that the owners could do availed to drive out the fire, and the splendid mine has been practically abandoned, though a little coal is now being taken out on a level below a part that is on fire. The object of the Commission is to learn whether something cannot be done to save so valuable a property as the Foord pit. — *Halifax (Nova Scotia) Herald.*

Farady's Disinfecting System.—In 1825 Professor Farady was consulted by the Government about the disinfection of the prison at Millbank. The space amounted to nearly 6,000,000 cubic feet, and the surface of the walls, floors, ceilings, etc., was about 1,200,000 square feet. This surface was principally stone and brick, most of which had been lime-washed. A quantity of salt reduced to powder was mixed with an equal weight of binoxide of manganese, and upon this mixture were poured two parts of sulphuric acid previously diluted with one part of water and cold. The acid and water were mixed in a wooden tub, the water being first put in, and, it being more convenient to measure than to weigh the water and acid, ten measures of water and nine of acid were used; half the acid was first used, and when the mixture had cooled the remainder was added. Into common red earthern pans, each capable of holding about a gallon, were put 3 1-8 lbs. of the mixed salt and manganese, and there was then added such a measure of the diluted acid as weighed 4 1-2 lbs.; the mixture was well stirred and then left to itself, and all apertures were well stopped. The action did not commence immediately, so there was sufficient time for the operator to go from pan to pan without inconvenience. On entering a gallery 150 feet in length, a few minutes after the mixture had been made, the general diffusion of chlorine was sufficiently evident; in half an hour it was often almost impossible to enter, and frequently on looking along the gallery the yellow tint of the atmosphere could easily be perceived. Up to the fifth day the color of the chlorine could generally be observed in the building; after the sixth day the pans were removed, though sometimes with difficulty, and the gallery thus fumigated had its windows and doors thrown open. The charge contained in each pan was estimated to yield about 5 1-2 cubic feet of chlorine gas. In fumigating a space of 2,000,000 cubic feet, about 700 lbs. of common salt and the same of binoxide of manganese were employed, and it will appear by a slight calculation that about 1,710 cubic feet of chlorine were employed to disinfect this space. In common cases Farady believes that about one-half to one-fourth of this quantity of chlorine would be sufficient. — *The Architect.*

The Brux Disaster.—A remarkable disaster has occurred in the old German town of Brüx, in northwestern Bohemia, in many respects recalling the recent disastrous earthquake which almost entirely destroyed the town of Laibach, in Carniola. On Friday, July 19, the inhabitants of Brüx were alarmed by the sudden extinguishing of street lamps, and at first it was surmised that an accident had occurred to the gasworks. The report, however, spread that a large number of the houses in the Bahnhofstrasse were in imminent danger of collapsing, which was shortly afterward confirmed and supplemented by the news that the "Anne shaft, belonging to the Brüx Coal Mining Company, in the vicinity of the town, had been completely flooded by an inrush of sand and water." In consequence of the reports the authorities took immediate steps to clear the houses in the Bahnhofstrasse of their inhabitants, and it is owing to the promptness with which these precautionary measures were adopted that the subsequent series of disasters were attended by comparatively slight loss of life. At about ten o'clock a house in the Bahnhofstrasse completely collapsed and a crevice of about three metres in width opened in the middle of the street, letting out a voluminous and unceasing stream of water. At comparatively short intervals the houses continued to fall, and in some instances the *débris* caught fire, igniting the edifices which still remained standing. Towards three o'clock in the morning several houses in the neighboring street likewise collapsed, but the inhabitants succeeded in escaping in their sleeping clothes. The horror of the situation was greatly increased by the total darkness which prevailed, together with a heavy downpour of rain. The descriptions of the scene which have reached Vienna are heartrending in the extreme, the panic-stricken, half-clad inhabitants crowding the streets, not knowing in what direction to fly for safety. Early yesterday morning, in view of the danger which still threatens, the authorities ordered the clearance of the houses in that part of the town which has suffered most severely. Up to the present, eighteen houses are in ruins, and it is expected that many others will have to be pulled down. The damage is estimated to exceed 1,500,000 florins. In consequence of the breaking of the main gas and water pipes the town is without light or water. The distress which prevails is very great. Yesterday, during the last sitting of the Reichsrath, the Government was called upon to take prompt measure to alleviate the distress, and in view of the magnitude of the disaster to make use of the funds at its disposal for such purposes to assist the sufferers. The money thus expended by the Government will be voted during the next session. — *Vienna Correspondence, London Times, July* 21.

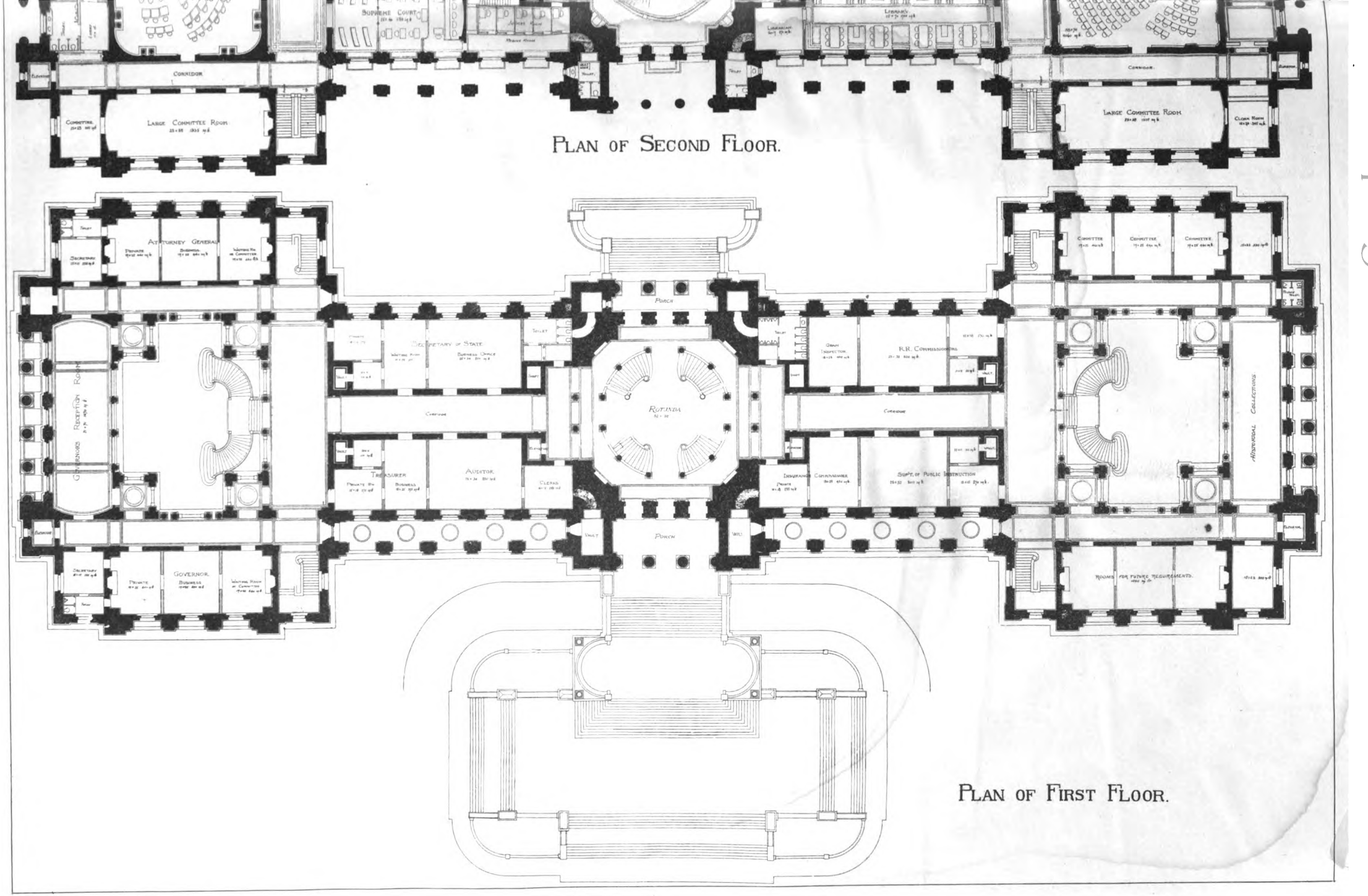
The Rape of a Church.—Many strange incidents are connected with the history of the restoration of churches, but none can match one which has just occurred in Brussels. Some time ago we advocated the immediate carrying out of essential repairs in the thirteenth-century church of the Sablon, in Brussels—a building which is more interesting than the cathedral church of St. Gudule. It was decided to undertake the necessary works, and they were placed under the direction of M. Van Ysendyck, an architect whose great book has demonstrated his acquaintance with Flemish architecture and the subsidiary arts. His name was a guaranty of a conservative restoration. Unfortunately there are too many examples of an opposite sort of treatment in Belgium as in France, and as a consequence restoration is too commonly supposed to mean the destruction of ancient work. Some practical joker or jokers, or it may be an enemy, resolved to take advantage of the delusion. Men were employed, apparently builders' laborers, and ordered to demolish the south porch of the church. It was not until a great deal of the masonry that could be reached without scaffolding was destroyed that the vandalism was suspended. It will appear strange that such a crime could be committed in one of the principal thoroughfares of Brussels without interference. The *curé* is an archæologist, and he believes there is not a more interesting building in Europe than his church. The architect dwells at no great distance. There is a public square opposite the building, and one of the palaces which is guarded by sentries is close at hand. So is the Palais de Justice. All these apparent impediments would not count for much against audacity, especially when it was known that destruction is supposed to be an inevitable accompaniment of the restoration of churches. Then again there are many authorities connected with a foreign church, and contrary orders are not uncommon. It was by chance M. Van Ysendyck heard of the attack on the porch. He lost no time in acquainting the police. But it was too late either to prevent irreparable injury or to capture the vandals. What was done was thoroughly done. The piers were subjected to so much brutal force, the fragments are useless for restoration. As the porch was propped to prevent the collapse of the arching, there is not likely to be any accident; but a venerable example of Gothic art has lost its original character. M. Van Ysendyck deserves the sympathy of architects, for we are afraid it is only an expert who could devise and direct the operations, and they were not attempted out of friendship for the architect. Whoever was the criminal, he was too crafty for the easy-going police. — *The Architect.*

Yankee Vandalism.—A writer in the Boston *Transcript*, giving interesting notes of a summer in England, confesses to shame in acknowledging his American birth because very recently the most noted portions of the old historic Warwick Castle have been closed to visitors because of the vandalism of American visitors. He says "they would bring knives and cut their initials in every available spot, and hack at the masonry for souvenirs, until all the world must be excluded from this highest and oldest part of the castle for fear of its ultimate surrender to the American jack-knife, after centuries of resistance to armed Britishers." Well, this relic-hunting trait is one common to Americans everywhere — but why it is so is not easy to tell. Almost the only criticism of visitors to the late Christian Endeavor convention, by the press of Boston, was in the form of a mild suggestion to them "to leave the Washington elm, as it would look better standing in Cambridge than to be pulled down and scattered in little pieces all over the country."

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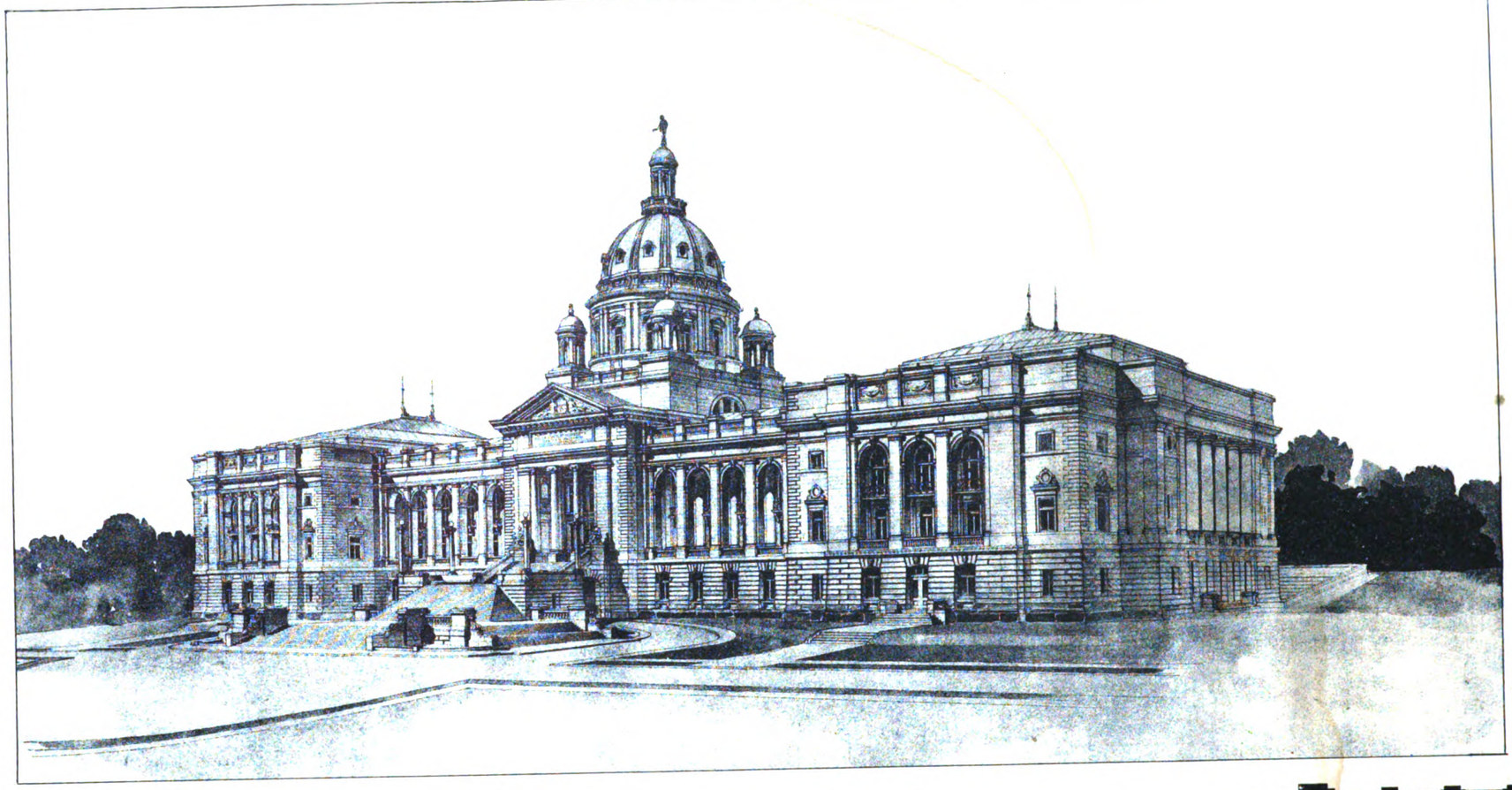
DESIGN FOR MINNESOTA STATE-HOUSE, SUBMITTED IN THE FIRST COMPETITION.

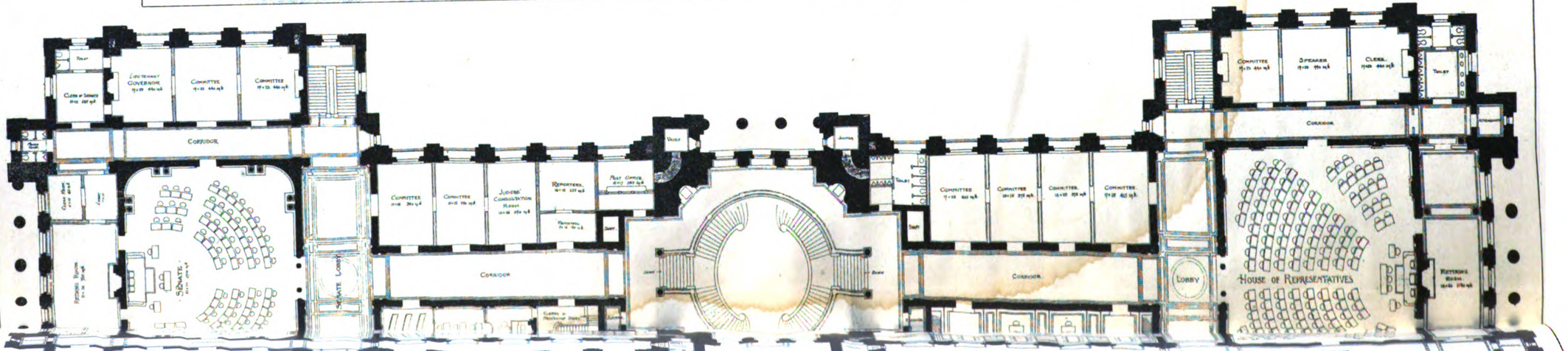
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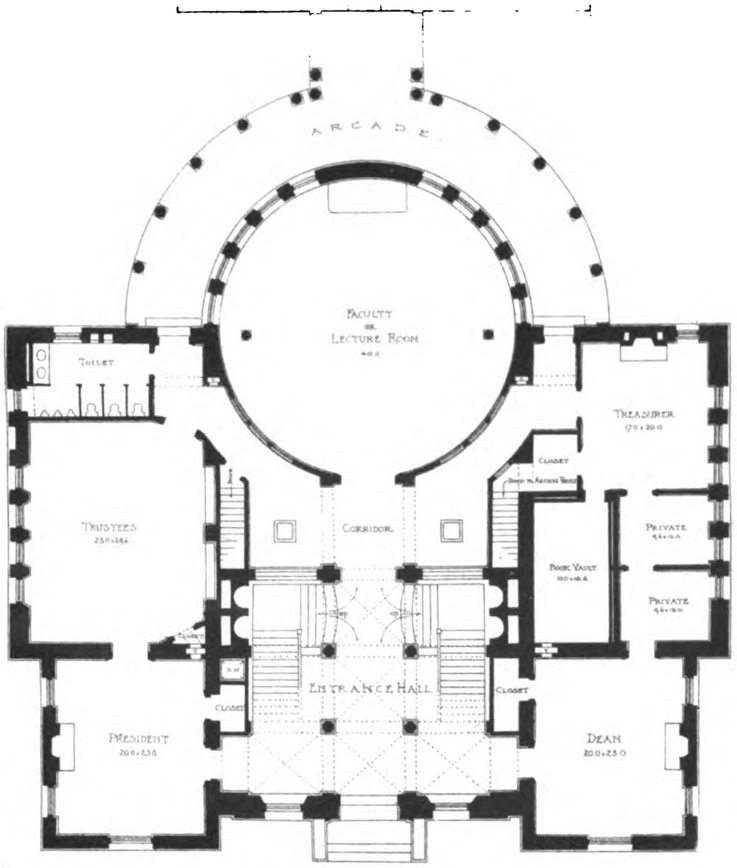


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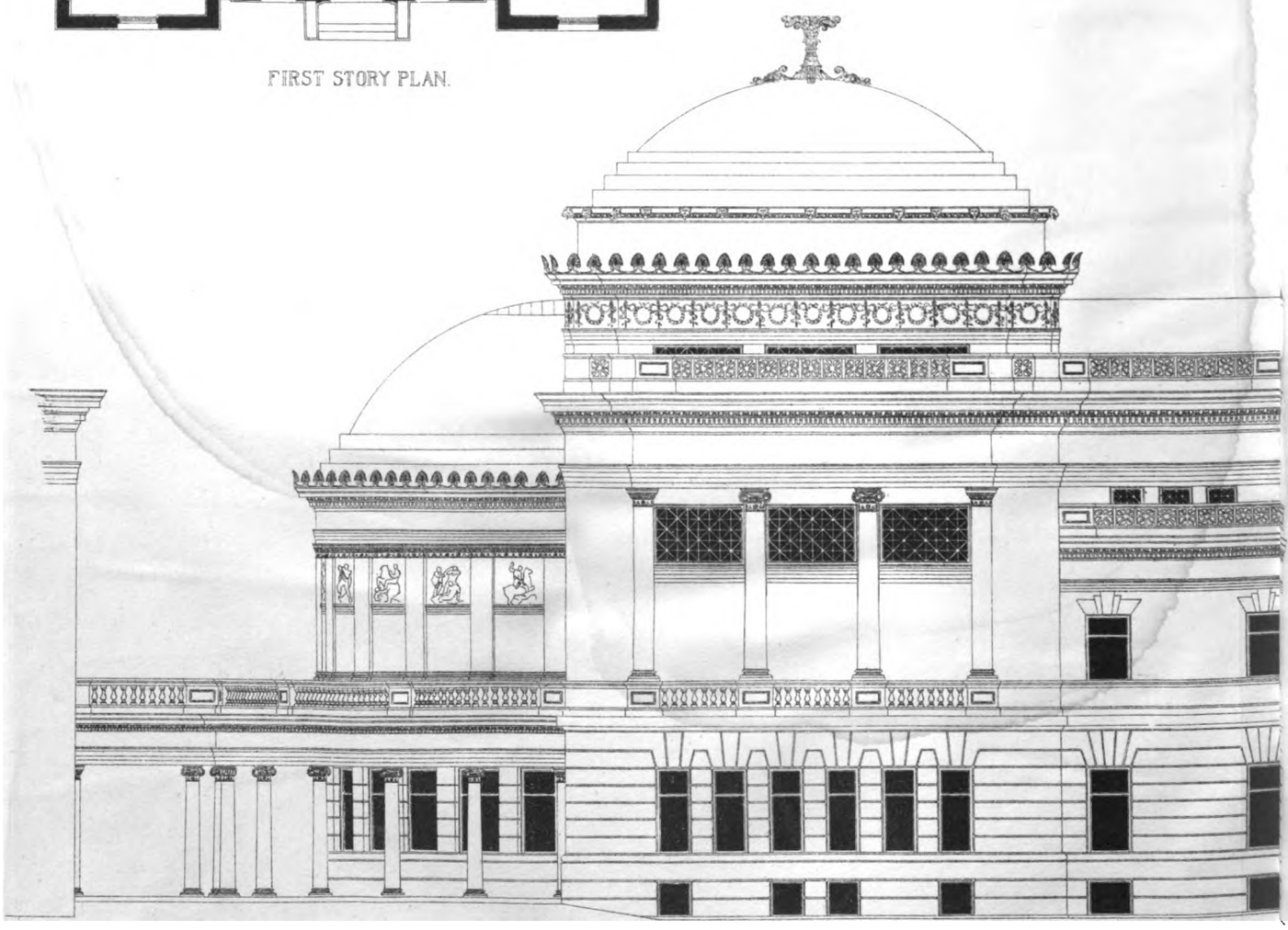
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FIRST STORY PLAN.



· SIDE ELEVATION ·

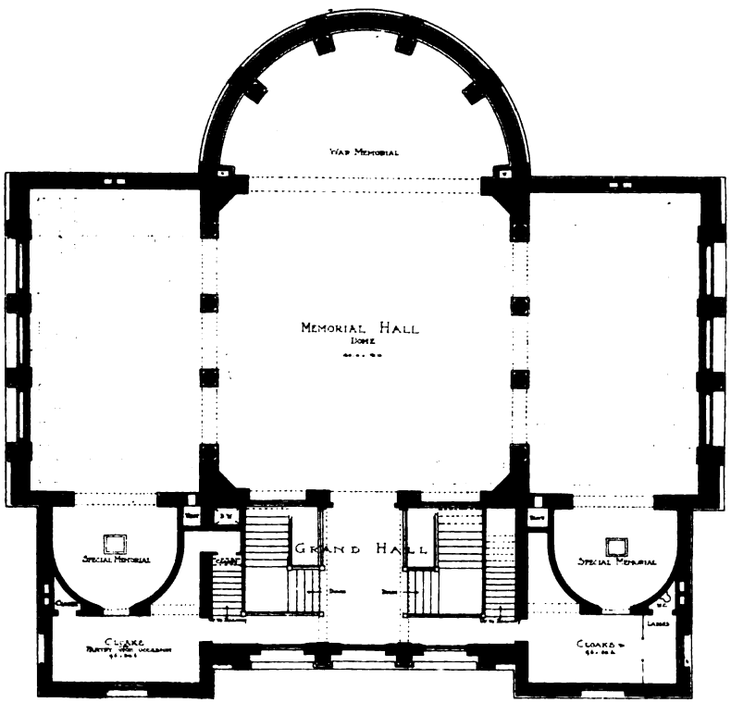
· ALUMNI MEMORIAL HALL

ALUMNI HALL: DARTMOUTH

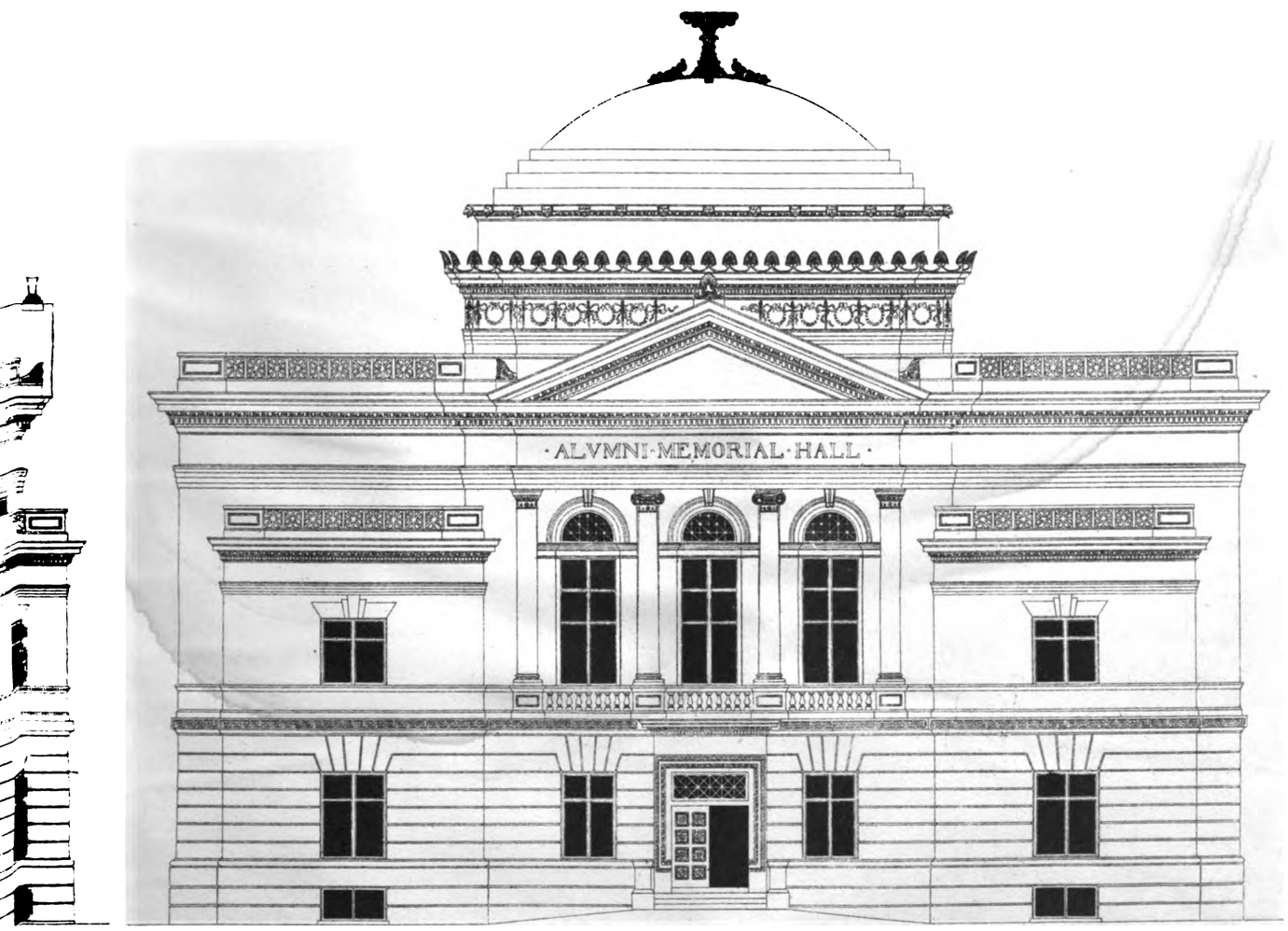
LAMB & RICH.

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SECOND STORY PLAN.



FRONT ELEVATION.

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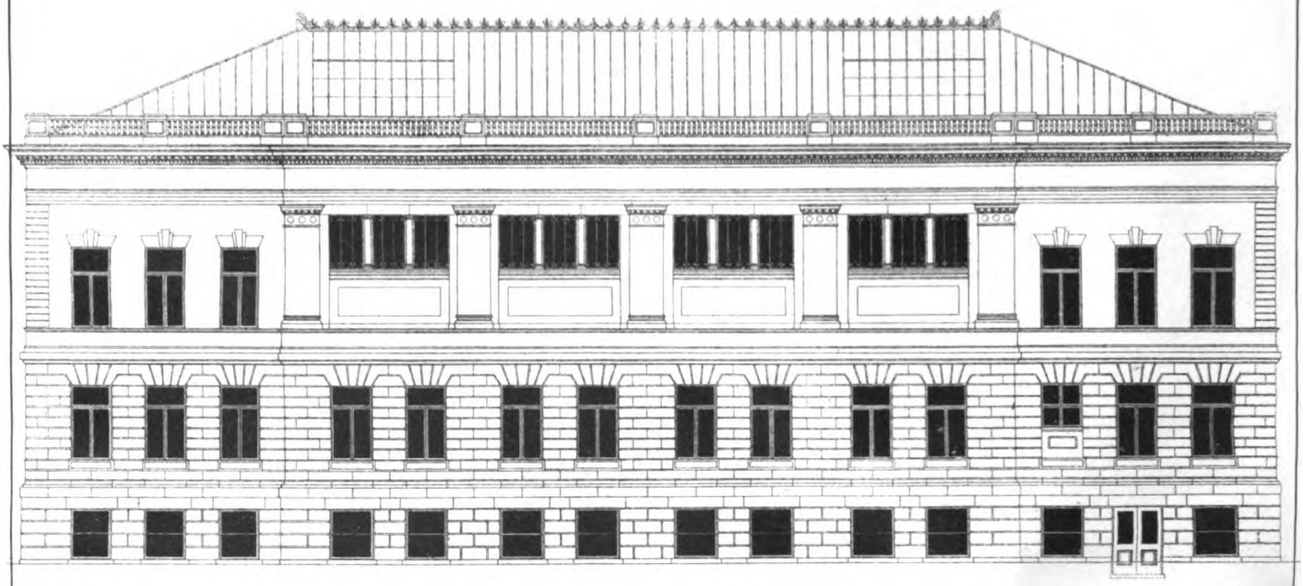
Architects.

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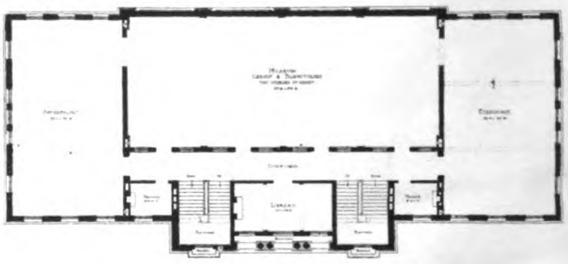
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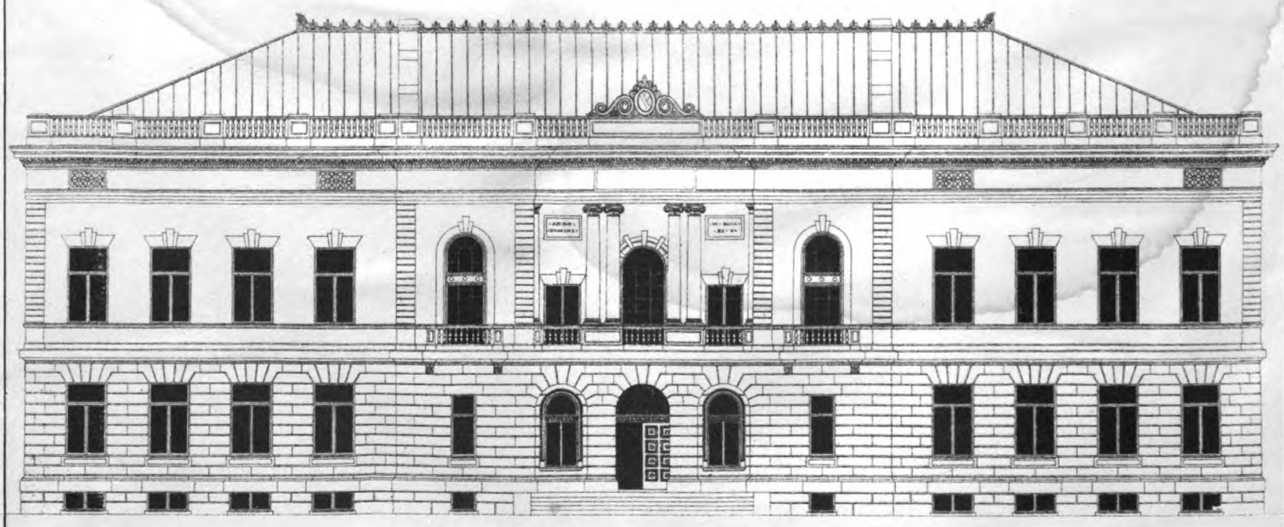
REAR ELEVATION.



FIRST STORY PLAN.



SECOND STORY PLAN.



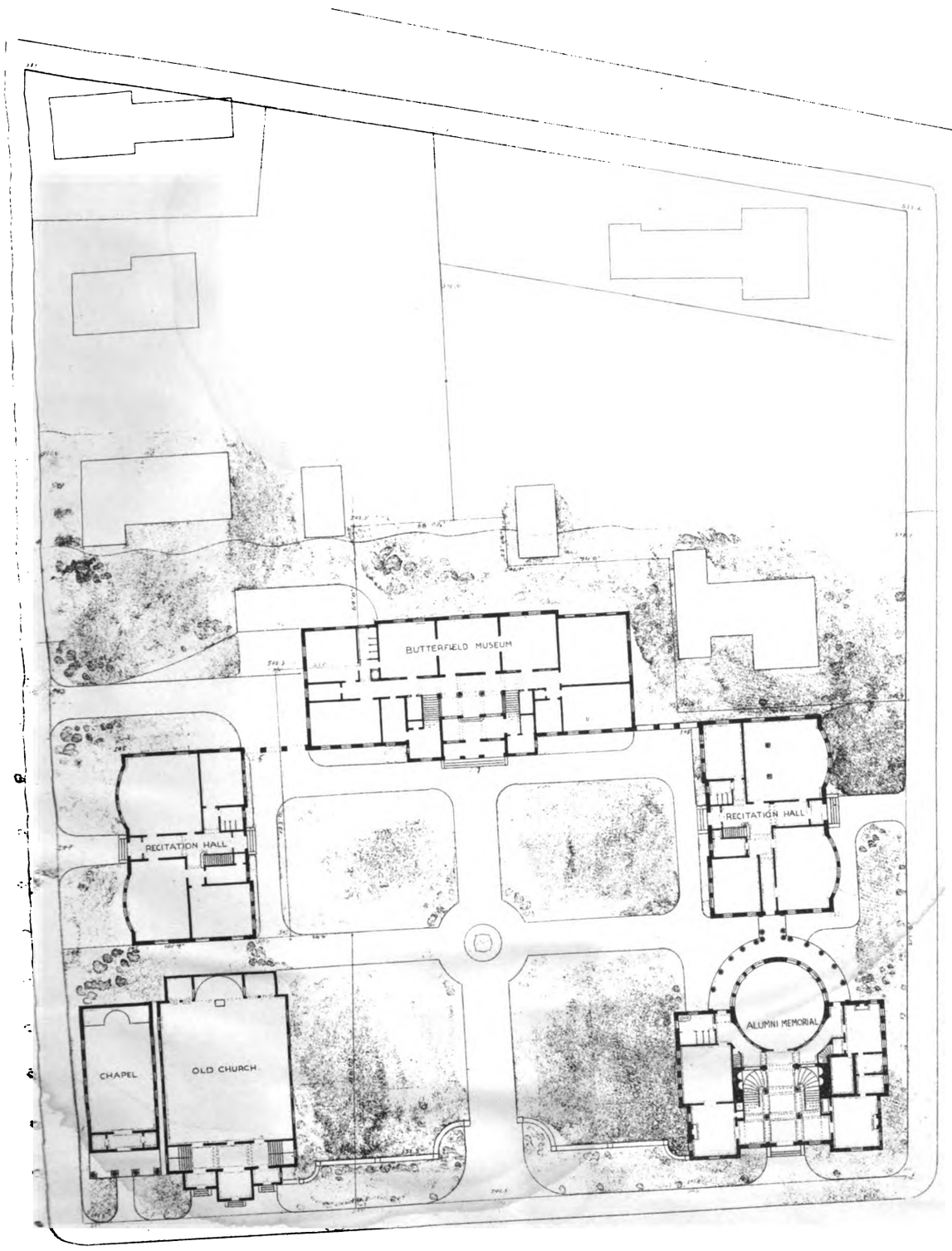
FRONT ELEVATION.

BUTTERFIELD MUSEUM: DARTMOUTH COLLEGE, HANOVER, N. H.

LAMB & RICH, Architects.

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PLAN OF NEW QUADRANGLE

Lamb & Rich, Architects, 95 Broadway, New York.

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AUGUST 31, 1895.

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THE investigation into the causes of the fall of the Ireland Building, in New York, seems to have been very thorough. As in another recent case, the coroner summoned a jury, composed mostly of architects and builders, and the testimony was taken with great intelligence and thoroughness. Briefly, the structure was originally intended to be seven stories high, but was made a story higher after the lower portion was built; the foundations and walls, which had been approved by the Building Department, were not increased in strength when the decision was made to put on an additional story; and, as it appears, the concrete foundations, which, according to the specification, seem to have been of reasonably sufficient thickness, were, without the consent or knowledge of the architect, made much thinner than the specification required. For example, the concrete footing under the central columns, which seem to have carried a very heavy load, was, according to the architect's testimony, required by the specification to be eighteen inches thick, and nine and one-half feet square. On this rested a granite block, six feet square, and one foot thick, and on this, again, a cast-iron plate, thirty-two inches square, and three and one-half inches thick. The soil seems to have been sand, so fine and soft that the architect directed planks on edge to be laid under the concrete. Under such circumstances, most architects would have wished to increase, rather than diminish, the depth of the concrete footing; but the contractor appears to have reduced it, making its thickness only twelve inches, instead of the eighteen inches specified. Moreover, there is some reason to suppose that an old well, or cesspool, loosely filled with rubbish, existed under a part of the footing of the column whose failure seems to have brought about the crash. The indications are that the footing of this column broke across, and the thin granite stone above it seems, on the failure of its support, to have broken also, allowing the plate and column to sink. According to some accounts, this failure, instead of taking place suddenly, seems to have occurred some time before the final collapse; for it is said that the middle portion of the upper floor of the building, which, of course, was originally laid level, was ten inches lower than the sides a day or two before the structure fell. We all know how enormously the sinking of an interior support increases the strain upon it, by throwing toward it the weights, which, so long as the floors remain level, are equally shared between it and other supports; and it is not surprising that such a movement, once begun, should soon culminate in the total disorganization of the structure. The contractor for the plastering had carelessly allowed a great weight of material to accumulate in the upper stories, and the composition roof seems to have been enormously overloaded with gravel, possibly to level up the sunken places for the owner's and inspector's eyes. In a newly built warehouse of proper strength, the piling of bags of plaster on the upper floor, or of gravel on the roof, while it might cause deflection of the beams, would have no injurious effect on the foundation; but, in this case, the foundation seems to have failed first, the overloading only hastening the fall, by which sixteen men lost their lives. The testimony of the architect showed that he was paid only six hundred dollars for his work on the building, including general supervision; that two superintendents were employed, after the foundation-work was begun, by the owner, and paid by him; that, although he visited the work about twice a week, he did not particularly inspect the trenches before the concrete was put into them; and that the change in thickness of the footings was made without his knowledge or consent. He had seen some of the concrete put in, but had not measured it, and did not imagine that the contract had been violated, not supposing, as he said, "that Mr. Parker would lay insecure foundations." On the testimony furnished, the coroner's jury found the architect, the contractor, and three other persons guilty of manslaughter.

SO far as the architect is concerned, the testimony does not appear to show any serious fault. With good concrete, on tolerably good bottom, particularly with planks underneath, a footing made as specified ought not to break under any load, and the effect of overloading would be simply to force it, as a whole, deeper into the ground. Such a movement as this would take place very slowly, if at all, and, as a footing of those dimensions, if unbroken, would support safely, over pretty soft ground, a far greater load than would be brought upon it, with girders and beams of ordinary spans, by eight floors and a roof of a new and unoccupied building, it seems clear that the accident was not due to the faulty plan or design of the foundation of this column. It seems, however, equally clear that it was directly due to the reduction of the thickness of the concrete footing from eighteen to twelve inches. As the resistance to breaking of a slab of concrete is roughly proportional to the square of the depth, it is plain that the reduction of the thickness brought down the strength in the proportion of 324 to 144; or, in other words, reduced its transverse resistance to considerably less than one-half of what it would have been if the specification had been followed. Even this, however, might have sufficed, the factor-of-safety in foundation-work being generally large, had it not been for the new element introduced by the reduction of thickness, in changing the proportion of depth and spread in the portion of the footing extending beyond the granite leveller. As originally designed, the concrete footing extended on all sides twenty-one inches beyond the granite block above it, with a depth of eighteen inches. It is usually assumed that, to be sure that a concrete footing will not break at the edges, owing to the combined effect of the pressing of the middle portion downward by the load, and the reaction of the earth around the margin, the projection of the concrete beyond the course above it should not exceed the depth of the concrete itself. This rule would give a projection of eighteen inches for the concrete footing in question, instead of twenty-one; but a greater projection than the strict forty-five degrees is often given, and a projection of twenty-one inches, with a depth of eighteen, could not be regarded as unwarranted by good practice. A projection of twenty-one inches, with a depth of twelve, is, however, a very different thing, and we think that most architects would expect such a footing, on compressible soil, to fail as soon as a heavy load came upon it. Certainly no architect would trust ordinary concrete under such a profile without filling the concrete with steel beams, to give the necessary resistance; and the failure of the footing, reduced to these dimensions, was only natural.

SUPPOSING our view of the cause of the catastrophe to be correct, the next question relating to the architect would be whether he could reasonably be held responsible for the consequences of the change in the thickness of the footings. That the change was made without his consent or

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knowledge is attested by his positive and repeated statements under oath; and his straightforward and intelligent testimony in other respects indicates that he is to be believed in this point; while his knowledge of theoretical construction, as shown in his statements, and in the design of the footings, as described, seems far too good to have permitted him to assent knowingly to a change which would fatally modify a proportion of projection to height which had evidently been studied with much care. If, then, he did not order, or permit the change, does the fact that he did not discover it render him jointly criminal with the contractor who made it? We can hardly think so. Every architect knows that it is by no means easy to measure the depth of concrete put into a trench. When the concrete is put in by sections, the depth of each section can be measured when the side of it is uncovered for laying the next; but where all is put in at once, the only way is to make marks on the sides of the trench, at the proper height above the bottom; or, as is sometimes done, to set stakes of known height in the trench, before filling in the concrete around them. It is not often that an architect can be on the spot at the time for applying these tests, even if it is his duty to do so, which, in the light of recent decisions, is very doubtful; and in the present case, where the architect had furnished clear, sufficient and precise plans and specifications, and the execution of the work had been committed to a contractor whom he had reason to believe faithful and reliable, it is difficult to see in what way he failed to fulfil his duty.

THE heroic death of Thomas Hovenden will consecrate the fame of an artist who had already won a secure position among the leaders of American art. It is hardly necessary to recall the many pictures of simple sentiment by which he has for many years held public interest in this country, but every one does not know that Mr. Hovenden was by birth an Irishman, having been born near Cork, in 1840. He studied in the art school at Cork, which, though not pretentious, has still a good reputation for the thoroughness of its teaching, and came to this country at the age of twenty-three. On his arrival, he entered himself as a pupil at the National Academy of Design in New York and studied and worked there until his removal to Baltimore. In 1874, always anxious for improvement, although he had already a reputation which most American artists would find sufficient, he went to Paris, and studied six years under Cabanel. Returning in 1880, he was elected a member of the National Academy, and his pictures have since that time constantly increased his reputation here and abroad. Although settled in Philadelphia, and a prominent member of the artistic colony of that city, he belonged, perhaps more than any other American painter, to the whole country, and his death, caused by his unavailing attempt to save a child from being run over by a freight train, will be generally mourned.

THE *Engineering Record*, speaking of the practice of placing main traps, with fresh-air inlet, on all house-drains connecting with a sewer, which, as it says, is "pretty generally considered necessary by American sanitary engineers," quotes an interesting report made to the Local Board of Hornsey, one of the suburban districts of London, by Mr. T. de Courcy Meade, the Engineer of the Board, who was desired to investigate the subject, and give an opinion on the advisability of making the use of main traps compulsory. Almost everywhere in England such traps are required on house-drains, but the Hornsey Board had been unfortunate, apparently, in its choice of the sort of trap to be required, for those first put in had given so much trouble by clogging with grease that there was a question whether they might not be dispensed with altogether.

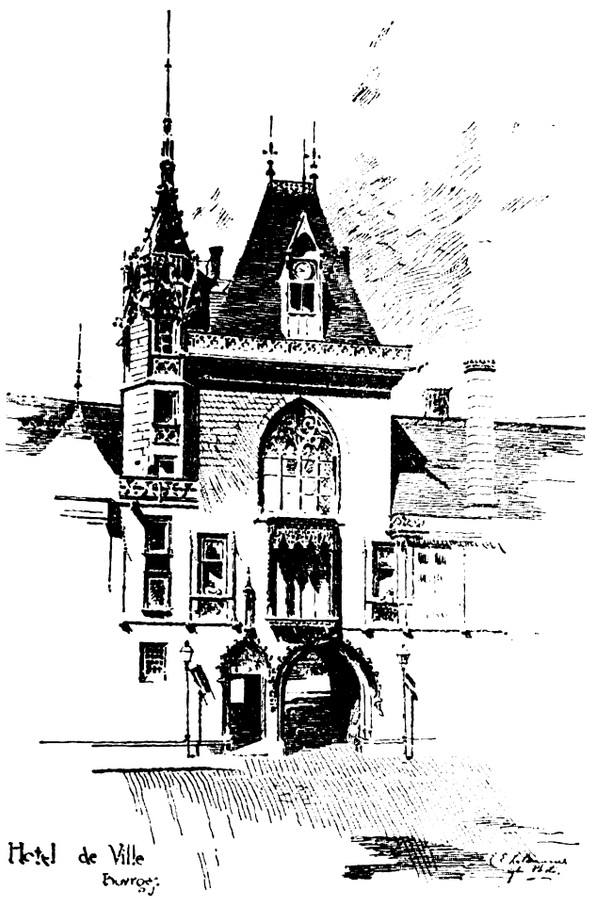
MR. MEADE began his report by showing how traps could be arranged, and were in other places so arranged, as not to clog with grease; and he gave a long series of abstracts of communications from local engineers, or of the results of his own investigations, indicating the practice in respect to traps of the town authorities of a large number of places. From the surveyor of a single town, Southgate, he received a letter, saying, "I may surprise you by stating I am strongly against the use of an intercepting trap between the house-drain and sewer, except in cases where the drains are laid under a building." What difference this surveyor could find, in regard to the necessity for an intercepting trap, between house-drains laid through a house vertically or horizontally is not very clear, but he seems to be quite alone in his view of the matter; for the twenty-nine other towns investigated without exception required or urged the use of intercepting traps. Of course, the object of leaving out the trap is to utilize the house pipes to ventilate the sewer; but no less than fourteen of the town surveyors applied to for information replied that they regarded the ventilation of sewers through house-drains as "objectionable," "dangerous," "fraught with the utmost risk," or "exceedingly dangerous." Mr. Meade himself, speaking of the common notion of engineers who have not made sanitary matters a study that the air in the house-drains is as bad as that in the sewers, and that there is, therefore, no danger in having the sewer air circulate through them, said, very frankly, that he had once himself accepted that view, but that his investigations into the actual conditions had shown him that it was erroneous. In house-drains, properly constructed, sewage remains but a few moments, the constant flushing removing matters to the sewer before they have time to decompose, while the current of air from the "foot-vent" to the roof is so rapid as to keep the air in the drains constantly and greatly diluted. In the town sewers, on the other hand, while the flow is rapid for eight hours of the day, it is reduced for the remaining sixteen to a mere dribble, quite insufficient for flushing, or washing off the slime deposited on the sewer walls. During this period, therefore, decomposition proceeds rapidly, producing vast quantities of a gas different from that found in house-drains. Moreover, as the flow of air in sewers, even under favorable conditions, is far more feeble than in house-drains, the connecting of the latter with the sewers admits to them a stream of comparatively undiluted gases, of a more offensive and dangerous sort than any that would, under ordinary circumstances, be found in them.

WE may add, on our own account, that the sewer vapors are liable at any moment to be loaded with a cloud of diphtheria or scarlet-fever germs, poured into the sewers from the drain of an infected house, and that these germs pass thence into the untrapped house-drains, from which they may, and do, issue abundantly through defective joints, or through the traps of fixtures which have been for a time unused, ready to carry out their mission of pain and death. To our mind, this is the principal reason for requiring main traps on house-drains connected with sewers, and it is a very sufficient one. Not one householder in five hundred knows that if he leaves his house unoccupied for two or three weeks, while he and his family are enjoying a vacation in the country, his bath and wash-basin traps are likely to dry out, admitting to his rooms a copious stream of whatever gases may be in the house-drain. If the drains are cut off from the sewer by a trap, nothing can get into them from the outside, and the vapors from an unused house-drain, aerated and dried for two weeks by the regular current through it, would not be very bad, and, at least, would contain no diphtheria germs, unless there had been diphtheria in the house before leaving it; but, with an open sewer connection, the current through a dry trap is more than likely to contain specimens of all the zymotic ferments produced in the whole city, which will accumulate to welcome him and his children on their return. It is much to be desired that every case of diphtheria, or scarlet fever or measles, should be followed by an examination, not only of the house-drain, but of all the drainage conditions. It is our impression that many cases of scarlet fever, and some of diphtheria, would be found to occur among children who have just returned from a summer vacation to a city house with unguarded sewer connection. It would not be very difficult to make such an inquiry in the few towns in this county where house-traps are not used, and the result would be of incalculable value in fixing future municipal practice in sanitary matters. As a collateral matter, the subject of the effect on the health of children of being obliged to live, or pass daily, near the open sewer manholes which it is at present the delight of city engineers to scatter broadcast through the streets, might also be inquired into with great advantage; and some of our young engineers or students might do the world a service, and perhaps save many precious lives, by a candid and thorough examination of these questions.

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A SYLLABUS OF EARLY CHRISTIAN, ROMANESQUE AND GOTHIC ARCHITECTURE.[1] — II.

HISTORICAL INTRODUCTION.



THE time of general dissolution when the Roman empire had gone to pieces.

THE NEW NATIONS.

Beginning of the migration of the Teutonic tribes, 375 A. D. The Westgoths in Italy, 400–415; in Spain, 507–711. The Franks and the Burgundians in Gaul. Angles and Saxons enter Britain.

The Merovingian Kingdom, 486–751. Kingdom of the Ostrogoths in Italy, 493–555. Byzantine Conquest, 535. Kingdom of the Longobards, 568–774.

The greatest victory won over these nations is their acceptance of the Christian faith, Arianism. Many of the Teutonic nations were Arians and therefore in conflict with the Papal See.

The Roman Church. — It appears probable that the transfer of the seat of government of the Roman Empire from Rome to Constantinople, and the subsequent period of wars, conquest and anarchy, afforded a fitting opportunity for the Bishop of Rome to become head of the Christian church, which would not have occurred under a strong government.

The firmest upholders of Catholicism were the Franks. The Merovingians are important only in so far as they united different kingdoms under one sceptre and compelled conversion by the sword.

The missions extend the Roman type of church-building (basilical) as well as the faith.

The star of the Papal See rises with the Carolingians, who consider themselves defenders of the Catholic faith against the heathens, as well as the Arian Longobards and the Schismatic Greeks.

CHARLEMAGNE, 768–814.

His reign the beginning, in art, of the Romanesque period. Impulses toward a renascence of culture after the long period of barbarism and war are found in his administration of government and in his interest in art and literature. He tried to create something similar to the past among his free Germanic nations. To accustom his warriors to an ordered and domestic life by his own example and an extensive legislation; to protect attempts of higher civilization for the sake of the growth of it in his newly-founded empire; to draw art and learning nearer to his person and re-create in his surroundings the old splendor of the imperial court at Rome, are natural features of his policy.

The historical position of the Germanic nations is rendered different from that of any previous by the desire to create a Christian world-monarchy as strong and solid in its composition as the deceased Roman, but based upon the recognized liberty of the individual and the mutual agreement as to the extent of duty and privilege. They have to grope their way to the realization of the new ideals.

An important event is the division of the Carolingian empire into separate kingdoms [Treaty at Verdun, 843], each of which soon develop national peculiarities.

At the same time the existence of provincial (and tribal) differences marks the style of each region and in spite of common characteristics gives the Romanesque architecture its surprising richness and variety of form.

Romanesque architecture rests in its main characteristics upon the ideas brought forth in the Early Christian basilica as they probably existed throughout the empire before the invasion. The style may be said to be derived from Rome, but in its development far from the vicinity of Rome and even of Italy, with new materials at first roughly treated, it led to a very different mode of construction and decoration.

The two forms of Early Christian architecture — *the concentric building and the basilica* — are continued: the basilica as the church proper; the concentric structure especially utilized as memorial edifice, mortuary chapel and baptistery [Italy]. The principles of both, however, are in course of time blended, mainly by the introduction of vaulting, and result in a new structure that is an advance upon the previous ones.

The study of Romanesque style chiefly consists in considering the changes which the basilical plan undergoes under the influence of the spirit of the new nations. The technical demands, the demands of the climate and the lack of experience inflict much labor and slow progress upon the builders.

TYPICAL TRAITS OF ROMANESQUE ARCHITECTURE.

It is difficult to give a general review of the Romanesque style, because it, more than any other style — in spite of the common faith and liturgical demands — is dependent upon and marked by national and provincial preferences. There are a few traits, however, that serve to form the general type, though this, to be completed, must be studied in its different aspects in each separate land.

This type consists, to begin with, in a less spacious, less lofty structure than the Early Christian basilica. The *wooden churches* that were probably erected at first passed away except in a few cases, and buildings of more or less *rough masonry* superseded them, having heavy walls, narrow openings, square piers or clumsy columns and wooden ceiling or coarse vaulting. To these buildings towers were added.

In time this coarse type is changed into one much more refined and dignified. The methods of building become more secure and the sense for the beautification of the object more acute. The building then rises to an impressive height, the old division into three aisles is mostly maintained, the side-aisles being always proportionally narrower than the nave or middle aisle. For the division of space a system is adopted by which the building internally, as well as externally, receives the appearance of symmetry and proportion that is of much æsthetic effect.

In *Germany* the Romanesque period lasts from the Franco-Carolingian age till the end of the thirteenth century.

In *France*, till the twelfth century.

These are the countries that mainly influence the others.

In *England* Romanesque architecture is introduced by the Normans and continues even till the thirteenth century.

To *Spain* it was communicated through the provinces of Southern France.

In *Scandinavia* Germany is predominant.

In *Italy* it is in use from the eleventh to the thirteenth century. Italy is to some extent influenced by the neighboring countries.

Because of the marked difference between the buildings of Romanesque style according to the period or the province where they originate, it is a matter of recent arrangement for the sake of a general survey to divide the whole number of structures into two main groups,

ACCORDING TO GROUND-PLAN:

1. *Buildings of the cruciform plan,* which comprise the greater multitude of monuments typical for the time, and
2. *Buildings of the concentric plan,* a small but distinguished group.

OR, ACCORDING TO ELEVATION:

A. Buildings of the basilical type, which also comprise the greater mass of monuments and

B. Buildings of the non-basilical type, that form a smaller, very select group of edifices.

THE EVOLUTION OF CONSTRUCTION.

Material. — Wood, stone, concrete, brick.

By far the greater number of mediæval edifices are erected of stone. The walls are built up of courses of masonry with pebble or mortar filling, or of brick with stone facing; the vaults are of more or less irregular stone in mortar bedding.

Ground Plan. — Prototype is the plan inherited from the Early Christian basilica. The first and main change the latter undergoes

[1] Continued from No. 1023, page 52.

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in the Romanesque style is the development of the Signum Tau form into the so-called *Latin cross*. The Latin cross probably originated as early as the Franco-Carolingian period.

Its immediate cause was the increase of the ministering clergy in large churches (hence the demand for more space) and the extension of the crypt from a mere cavity into an oratory.

These reasons led to:

a. The establishment of a real choir by adding an extra space in front of the apse.

b. The elevation of the choir above the level of the nave.

Further changes were:

1. The general adoption of the transept as an organic part of the edifice.

2. With a view towards better regulation of space, the square that was formed at the intersection of the nave with the transept was settled upon as the norm to be repeated in all parts of the plan, in the nave, the arms of the transept — the space in front of the apse being whole squares; the aisles, half squares, etc. With the freedom and irregularity characteristic of Romanesque style, this ideal, however, is not generally adhered to until vaulting becomes permanent.

The cruciform plan may be considered as approaching the concentric type in structures that have *double choirs* or *double transepts* — an exaggeration of the cross caused by the dedication of the same edifice to more than one patron-saint and a corresponding increase of altars.

Of importance for the later development of the style is especially to be noted the enrichment of the plan of the simple apse by extension of the aisles beyond the transept so as to form *subsidiary choirs*. *The continuation* of the subsidiary choirs entirely around the apse is a further elaboration of the scheme. It is seen as early as in the plan of St. Gall (830) and appears in the east-choir of St. Michael at Hildesheim.

The same plan (but derived from another source) appears at St. Remi at Rheims (eleventh century) with the difference, however, that a *row of columns* takes the place of the wall between the apse and the aisle and with the *addition of semicircular niches or chapels attached* to the aisle. It becomes a motif of much consequence in the vaulted structures of Central France and is represented in Germany by the choir of

St. Godehard at Hildesheim.

Irregularities such as (1) extreme elongation and square ending of choir, and (2) absence or displacement of transept (western transept) and other minor changes, are mostly of strictly provincial character or belong to the style adopted by certain religious orders.

The atrium of the Early Christian edifices disappears. Instead of this, a small *vestibule* of the width of the nave with towers to flank it precedes the nave and forms the entrance of the façade or west end of the church.

As indicated, the position of the *towers* is altered. Instead of the separate structure of Early Christian architecture the tower is drawn into close contact with the building. The originally circular shape made the adjustment of the tower very difficult and unsightly. A powerful square belfry was raised, instead, over the vestibule, or two less massive structures were made to flank the entrance. Small towers such as used for staircases were transformed into polygonal shape and adjusted to the transept or choir.

Elevation. — As a matter of general interest it may be said that in elevation the predominant structure, the basilica, is characterized by three or more aisles and by the superior height of the middle aisle which admits light to this room independently of what it may acquire through the side-aisles. Other structures that have only one aisle or aisles of equal or almost equal height are for this reason not considered basilicas.

The building, however, whether it be a basilica or not, is characterized by more or less articulation of the constructive membering. In the horizontally ceiled basilica, the walls have no special weight to bear and remain of moderate thickness and plain appearance, while those that support vaulting display in time a marked character, with all parts prepared and moulded for their enterprise. Thus in the interior a succession of members strengthens the resistance of the wall and leads the pressure from above down to its main opponent, the floor, while on the outside the unsightly pilaster-strip is replaced by a solid buttress assisted in its work by the sloping roof of the aisles.

These general hints, however, have to be carried out in detail, in order to be understood.

While in the ground-plan the general *disposition of space* is the prominent feature, in the elevation the *kind of roofing* employed is of special importance. The nature and form of supports have to be in accordance with and depend upon the weight and construction of the ceiling. As a general thing it may be stated that the *changes and alterations* begin in the ground-plan until a system has been formed for the upper parts of the structure also, which *reacts* upon the ground-plan and causes it to conform to the principle of general safety and consistency. In Romanesque architecture it is peculiar that vaulting is anticipated in the substructure long before it is actually brought about.

THE EVOLUTION OF MEMBERMENT.

The earlier structures wherein the traditions of the Early Christian style are still maintained are, of course, the less perfect ones.

In the interior *the wooden ceiling* is strangely *neutral and preliminary* in its appearance. It is a remnant from the time of haste and poor facilities which characterizes much of Early Christian architecture. The wooden beam above is strangely out of keeping with the masonry beneath. The prevailing *horizontalism* of most churches of early Romanesque design depends upon their relation to the Early Christian style. The *vertical* memberment is of much later date. The beginning was made mainly for the sake of appearance. It consists at first, merely of a strip of vertical moulding connecting the supports below with the horizontal line above. Later on, bands of masonry or semicircular shafts rise to the edge of the ceiling and divide the wall-space into regular fields wherein windows and arcades are grouped symmetrically, in contradistinction to the previous co-ördination.

The idea of grouping is first brought forward by the *alternation of supports* settled upon as an improvement of æsthetic kind. A slender member is placed between two more massive ones, a large arch extends from the heavier member including the weaker one and two arches of second order. The pleasant effect of this rhythmical exchange is increased when — as happens — the movement below is repeated, but in smaller proportions, by the arcades that open between the upper and lower story. This is a method that proves of much consequence during the whole mediæval period.

In this connection the important function of the *pilaster strip* ought not to be overlooked. In Roman architecture the mural band performs constructive as well as decorative service, and the succeeding ages did not forget to take advantage of this most useful quality. On the exterior the heavy band of masonry indicates the divisions of the interior system. It steadies the clerestory walls against the weight of the comparatively light roofing; it connects the upper story with the lower, externally as well as internally, and it increases the resisting power of the side-aisles against the pressure of the nave; it lines the apertures and strengthens the corners and, in connection with arcades, it furnishes almost the only decoration there is. Even after vaulting is introduced the pilaster-strip remains in power, partly as an actor, partly as a mediator and performs the function at once modest and important of pointing the way for the flying and standing buttress whose faint predecessor it is.

M. Wergeland.

[To be continued.]

THEATRES.[1] — XIX.

GARRICK THEATRE.



Plan of Garrick Theatre.

MR. JOHN HARE, the popular London actor, is the owner of the Garrick Theatre, Charing Cross, and as he is about to visit America, I have had lent me for the purposes of this article by the architect of the building, Mr. Walter Emden, the plans, sections and drawings in order to lay them before the readers of the *American Architect* at a time when they are most likely to be interested in Mr. Hare's theatre.

Although not a large building, the Garrick is probably more luxuriously fitted up than any other theatre in London. Every detail which could add to the comfort of the visitors was considered by Mr. Hare and his architect at the time of the erection of the building. It is a notable fact that the desire to do everything for the comfort of his audience extended at the time not only to all the occupants of the half-guinea stalls, but also to the frequenters of the pit and gallery. Not content with furnishing the theatre with the ordinary armchair usually to be found in the stalls, Mr. Hare, the manager, had chairs specially designed and made for

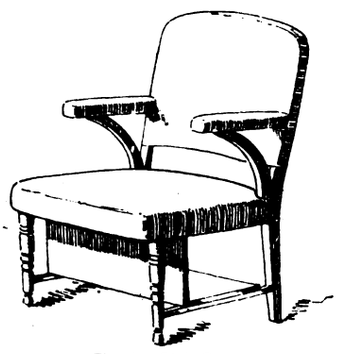


Fig. 1. Stall Seat.

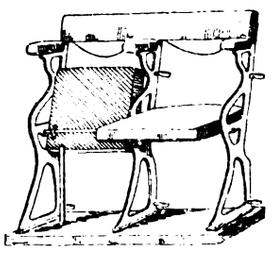


Fig. 2. Pit Seat.

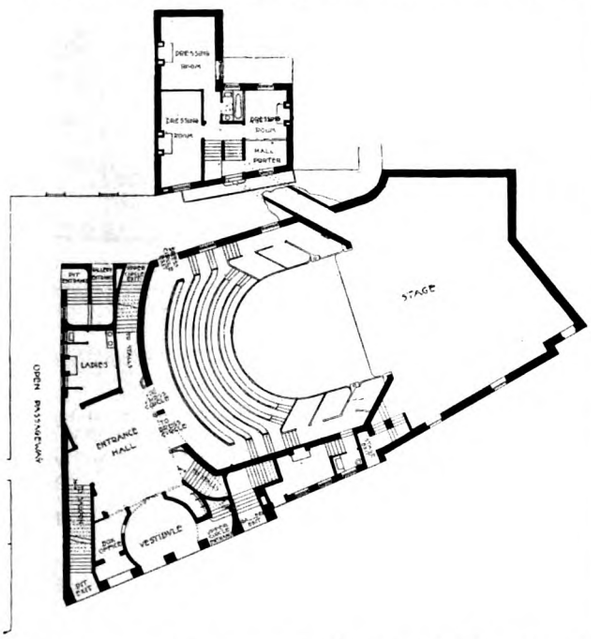
the various parts of the house. Figure 1 is a sketch of the stall seat; it will be seen that underneath the seat a board is placed to form a receptacle for the hat and coat of the person seated in the

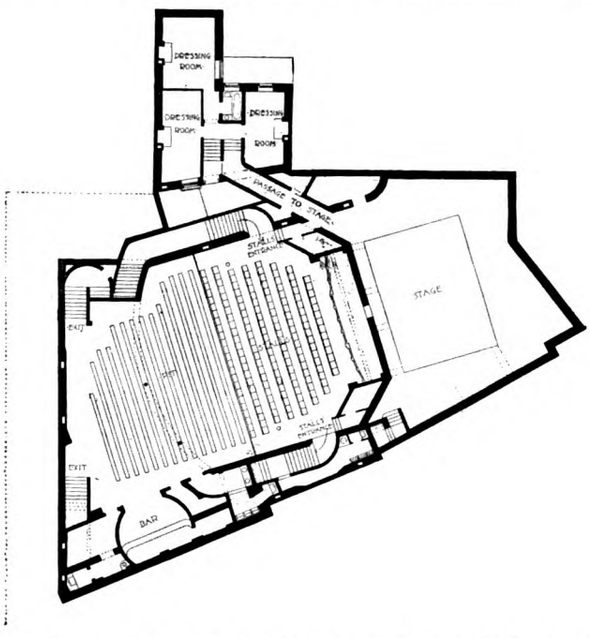
[1] Continued from No. 1025, page 68.

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row behind; an upright board is also fixed under the seat to prevent the person in front kicking against the hat, etc., of the one behind.

Figure 2 is a sketch of the pit seat. This is provided with a cord at the back for hanging coats and a place at the side for holding umbrellas, sticks, etc. I give these illustrations merely as examples of the way the whole of this house has been fitted up in effort to create comfort for the audience. Nowhere have I seen dressing-rooms fitted with such comfort and, indeed, luxury; while these rooms contain all that is necessary for an actor or actress to have in a dressing-room, they have none of the unsightly and untidy appearance common to the general run of rooms used for this purpose. The lavatory basin, the wardrobe hangings, cupboards, dressing-tables and other accessories for the dressing-rooms are all specially made and enclosed with mahogany fittings. The majority of the floors are covered with





Turkey or other costly rugs, and the furniture itself consists of good examples after Chippendale, Sheraton, or other well-known designers.

Speaking now of the general structure and its arrangements: it will be seen from the ground-plan how irregular is the shape of the land upon which the theatre stands. There is one frontage towards Charing Cross Road which really consists of the side of the vestibule, the auditorium and the stage. The house is a small one, and its approaches are in proportion to its size. The outer vestibule is three parts of a circle, and affords the means of entrance to the dress or reserved portions of the house.

From the vestibule a large entrance-hall opens; this is situated at the back of the dress-circle: from this it will be seen that the dress-circle is on the street-level, and that the pit and stalls are formed below the level of the ground by excavation. The stalls are entered on both sides by staircases which start from the entrance-hall already described.

The auditorium of the house has been isolated by forming an open passageway at the back and the side; by this means exits are obtained into the passageway on the opposite side of the building to the entrances in Charing Cross Road. Other advantages have been taken into consideration in the formation of this passageway, the occupants of the pit and gallery having their separate entrances to the theatre at the end of the passage farthest from the street.

Here people can stand and await admission sheltered from rain by a glass awning some distance away from the traffic and danger of the streets and from carriages and cabs "putting down" at the main entrances. The pit and gallery extra exits are both placed in Charing Cross Road. The dressing-room block is a distinct and separate building, having but one connection with the theatre by a sub-way at the stage-level which is closed by an iron door. By shutting this door the artists are placed out of the reach of all danger from fire, which may arise from the stage, and are left in perfect safety with a separate entrance into the open air from the dressing-room block. In addition to the dressing-room, on each floor a bath-room and a lavatory are provided for every three dressing-rooms.

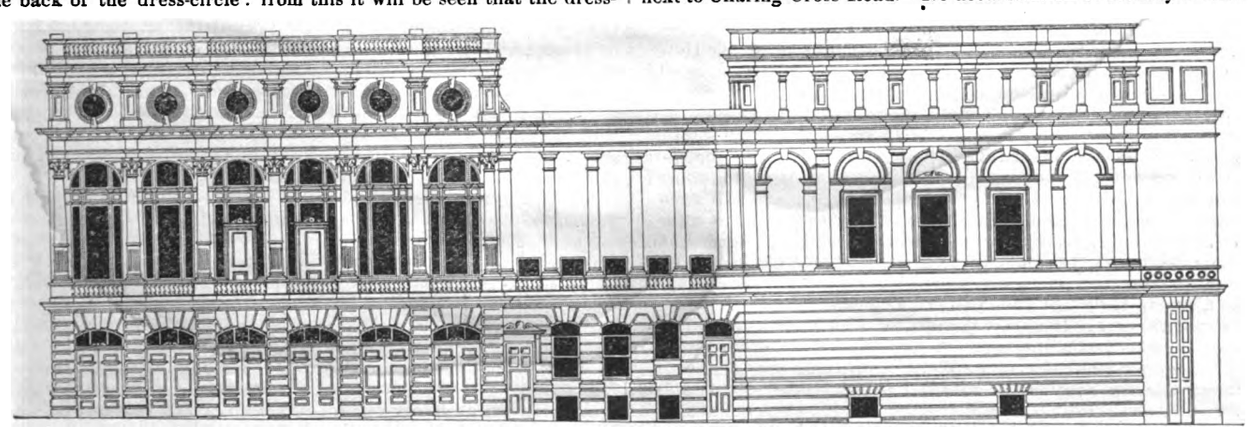
The area level, which is below the ground, is divided into pit and stalls, and as this is a house most frequented by wealthier citizens, in the fashionable world of London, as much and sometimes more of the space is allotted to the stalls, as to the pit. Indeed, at the height of the season the pit becomes smaller and smaller, while the number of rows in the stalls increase.

As to the construction of the theatre, Mr. Emden, the architect, has carried out the system he has adopted in so many other of his buildings, of making the structure entirely fireproof in all its parts.

All the tiers are built in iron and concrete; all the floors, passages, landings, corridors and staircases are of fireproof material, and all the walls and partitions of solid brickwork. The roof, also, is of iron, concrete and asphalt.

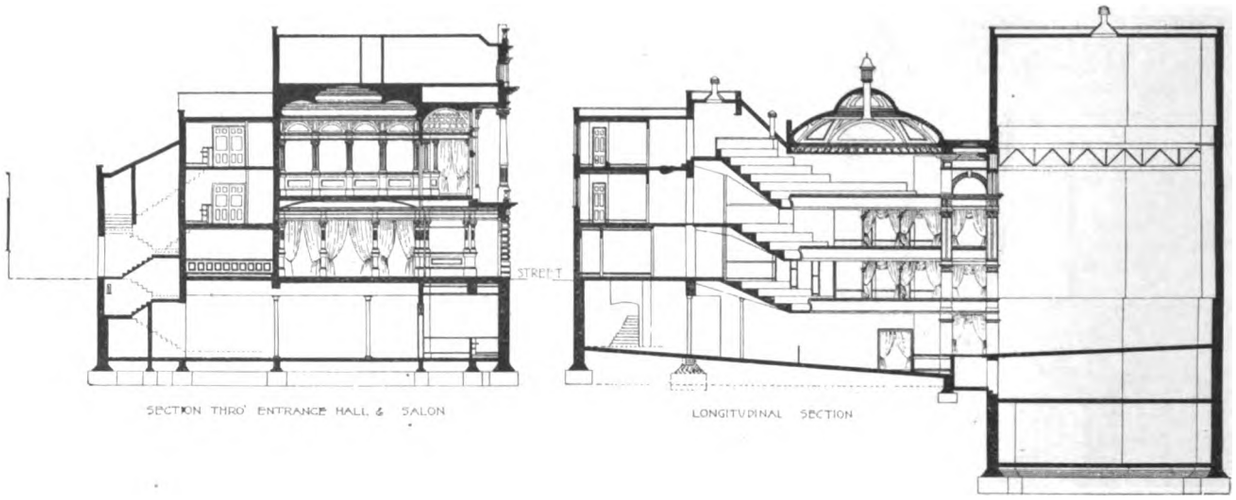
Especial facilities are given for removal of scenery to and from this theatre through a high door at the right-hand end of the façade next to Charing Cross Road. No accumulation of scenery is allowed to be kept in the theatre. The plays produced are, as a rule, of a class that run for several months, and no stock scenery is therefore required, so the two or three scenes, usually of a most heavy and luxurious character, needed for the play are alone kept on the premises. This, of course, reduces the risk of fire considerably.

The house is lighted everywhere by electric-light, gas and oil being also used. The chief lighting power on the stage is electric-light which is even employed in lieu of the more dangerous lime-light usually found in theatres. In fact, lately, there has been a tendency in London to abolish the use of the lime-light and substitute the electric search-light in its place. Special impetus has been given to the movement, through the action of the London County



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Council requiring lessees to place the "holders" or "bottles" containing the oxygen and hydrogen gases in specially built fireproof and ventilated chambers, quite away from the theatre. Quite a number of minor lime-light accidents have occurred during the last twelve months, in two cases resulting in a small fire on the stage, and in one case in an explosion injuring one of the employés of a theatre. The most serious of all the accidents caused the death of a man at Fenchurch Street Station, by the bursting of a bottle containing oxygen. It is no wonder, therefore, that the London managers have adopted the safer system of the electric search-light, and Mr. Hare was one of the first to set this example.



The following are the leading dimensions of the building:

From curtain to centre back wall of pit	74 feet.
" " " " " " stage	38 "
Width between main walls of auditorium	50 "
Average width between main walls of stage	55 "
Width of proscenium opening	30 "
Distance from curtain-line to dress-circle front	33 "
" " " " upper circle "	35 "
" " " " gallery "	36 "
Height from pit floor to ceiling (at top of cornice)	40 "
" " stage to top of roof	56 "
Depth of stage cellar	20 "

E. A. E. Woodrow.

[To be continued.]

A PROPOSED SYSTEM OF RAPID TRANSIT FOR NEW YORK CITY.

THIS system devised by Mr. A. H. Thorp, a New York architect, proposes to supply Rapid Transit by six lines of tracks — two for express, two for way-trains, and two for freight — around the entire City of New York, along the water-fronts, and connecting in the upper part of the island with the New York Central & Hudson River, the New York & New Haven, and other railway lines. It also proposes a central longitudinal line of four tracks — two for express, and two for way-trains,— and transverse connecting lines of two tracks for way-trains, all these latter on existing streets, or on streets to be cut through, or widened.

It proposes to construct these lines on structures of masonry and iron, close up to the adjoining buildings on one side and open to the air and light on the other: at a height of about thirteen feet above the street-level, allowing all cross streets to pass under, and utilizing the street beneath for heavy traffic.

It also proposes an elevated boulevard or carriage drive-way above the railway lines, with a solid road-bed of concrete and asphaltum, on iron construction at a height of about twenty-eight feet above the street-level.

The abutting buildings, which on the longitudinal and transverse lines would either be altered or re-built to participate in the advantages of these new conditions, would have their floors on the street-level reserved for wholesale, or packing and delivery of goods, while the floors on a level with the elevated drive-way would be devoted to shops for retail business, etc.

The system proposes to arrange approaches to the drive-way at appropriate distances, by means of inclined roadways for carriages, and at the stations by flights of steps from the streets.

The central longitudinal four-track line would take up about forty-five feet in width and might occupy one side of the proposed new Elm Street, for example. The connecting cross lines (of two tracks) would not take up over twenty-five feet in width, and might be built in any of the cross streets.

It is argued that these lines would not depreciate the total value of property in the streets through which they would pass, as the depreciation in value of buildings facing the Rapid Transit galleries on the opposite side of the street, would be more than counterbalanced by the increased value of buildings abutting on the lines, whose third stories would thereby be rendered very valuable as stores and shops on elevated and beautiful drive-ways, which would doubtless become the favorite shopping streets of the metropolis.

In relation to the Girdle Line around the city, it is proposed to build it on land to be re-claimed from the rivers, but which already belongs to the City, having been conveyed to it, by act of September 28, 1871, and which extends from two hundred to seven or eight hundred feet beyond the extreme end of any of the present piers.

This would give the City real rapid transit and fast freight service by six lines of tracks, with a grade everywhere on a dead level, around the entire city; and would also add to the city along the whole line of the route two other entirely new and invaluable avenues of traffic and circulation.

It is proposed, first, to build a new system of piers, extending on an average about 100 feet farther out into the river than the present piers — but still remaining far within the city-limits.

By laying them out at an angle of about fifty degrees to the line of the shore, as shown by the illustrations, and making the piers all with two stories or floors, instead of one, a larger amount of dock-room and a greater number of square feet of floor-space on piers would be obtained, and yet bring the shore-end line of the new piers and docks 210 feet farther out toward the rivers — thus actually creating a strip between the outer line of the present river-front streets and the shore-line of the new piers of 210 feet.

The new piers *might*, of course, be built straight out into the rivers, as prolongations of the present piers 210 feet, but the building of two-story piers and carrying them out at an angle of about fifty degrees it is asserted would be a great advantage, in the facilities offered for landing passengers and freight on different levels, and for all vessels in approaching or leaving their piers, independently of the room saved.

It is proposed that the City reserve the first 100 feet inland of this strip of 210 feet, which may be filled in and sold as sites for new buildings, which would thus face at the rear on the old river-front streets and on the other side toward the rivers, on the new drive-way, and rising above it any number of stories desired.

These new buildings would probably be devoted in their lower stories to wholesale business, packing and freight, being easily accessible to the rapid freight lines, and in the parts on the level with the drive-way and rising above it to the best order of retail shops, and to hotels, apartment-houses, and dwellings. Thes facing as they would on a superb elevated boulevard, overlooking the rivers and shipping at a height of about 28 feet, would be withdrawn from the bustle and confusion of the traffic beneath and yet within easy access of the Rapid Transit.

A continuous covered arcade might also be arranged along the fronts of these buildings on a level with the drive-way, similar to that of the Rue de Rivoli in Paris.

The Girdle Line Viaduct, carrying the six railway lines at its first story and the drive-way at its second, would be about 70 feet wide and would be constructed on the site of the present wharves, and could be supported on piers of iron and concrete carried down to solid bottom at intervals of about 40 feet and spanned by truss-work, carrying on masonry and iron construction the superstructure; and at the different levels the street road-way — the railway tracks and the upper driveway.

The railway gallery would be entirely open on one side to the rivers, and on both sides at every cross street, though roofed-in overhead by the driveway and protected from the snow.

The entire deck of the road-bed would be covered with iron buckle-plates filled-in with gravel, in which would be bedded the rails and rail-carriers — a construction which has proved almost noiseless in Berlin on the Metropolitan Elevated Railway. Ample space could be reserved in this gallery for gas-pipes, electric-wires, pneumatic-tubes, etc.

The space underneath the railway gallery would be available as

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a covered and protected street, 70 feet wide, and augmented by the open street extending in width from the outer line of the viaduct to the wharf line, would make an avenue for heavy traffic 110 feet wide all around the city.

The great problem of getting around the Battery without taking away from, or obstructing the Battery Park, would be solved by carrying the viaduct, minus the private building sites, out beyond the present shore-line, reserving the ground-level for an extension of the present park — allowing framed views of the Bay through the colonnade and under the arches of the viaduct.

A great central station, or terminus, might well be built without obstructing navigation in the shallow water off the Castle Garden.

Such an improvement to the entire water-front of the city would render practicable and desirable the filling-in of the shallow water to the west of Riverside Park from 72d Street up, where the line of city-limits extends some seven or eight hundred feet out into the river, so as to form a broad plateau which could be used as an extension of the Park, and where a perfectly level speed-way could be constructed, three or four miles long.

The advantages of such a system as this, especially as regards the Girdle Road, would be manifold, as for example:

First. — The absence of necessity of great expenditures of money for buying up of private property.

Second. — The absolute absence of engineering difficulties.

Third. — The absence of necessity for obstructing or destroying the present highways of the City, or of disturbing pipes or sewers.

Fourth. — The grade of the road.

Fifth. — The improving of the piers and the extending of them farther out into somewhat deeper water, etc.

A liberal estimate of the cost of filling-in the 100 feet for building sites, is about $250,000 per mile, and of re-building the piers about $1,000,000 per mile, which would be $1,250,000 per mile.

The land acquired by the City would be about 400,000 sq. ft. per mile, which at the low figure of $10.00 per sq. ft., would be $4,000,000 per mile.

The franchise for the building of the railway lines would be an income to the City; and it is reasonable to suppose that if the City finds itself in possession of land sufficient for the laying out of two valuable avenues of traffic and circulation through its most crowded districts, it will not hesitate to avail itself of the advantages.

THE BREAD-AND-BUTTER SIDE OF ARCHITECTURE.

EVERY year earnest, enthusiastic young men are graduated from the Department of Architecture who are looking forward to winning a position in their chosen profession. They are graduated in several senses of the word, alligned, divided into degrees, and with the freezing and the boiling points clearly defined, having aims and purposes which are real to themselves if to no one else, and are ready for the hard experiences and the keen, relentless polish which contact with the unsympathetic business world will give them and which is so necessary for their final career. And not only from this University, but from other architectural schools throughout the country, as well as from numerous architects' offices, young men by the hundred are annually turned loose on the current of business affairs. Some are full of enthusiasm, others are earnestly practical, some are poetic by nature, and some are ready to take their places as wheel-horses in the hard tug of professional life; but all have one common purpose and one very decided aim, and that is to make money — to make it artistically, with proper regard for the æsthetic proprieties if they can, but to make money somehow. Disguise it as we may, impute as much earnest enthusiasm as we please to our motives, the fact remains that the man who expects to become an architect must have an opportunity to earn money, and the bread-and-butter side of architecture is one to which young men look forward with a great deal of apprehension. Their schooling may make them feel confident of their powers in solving æsthetic and practical problems, they may know that they have in them the germs of talent and may feel assured beyond any doubt that they are fitted to win a place in the world, but very few can calmly contemplate the possibility of being unable to even get the opportunity to show what they are worth. The painter or the sculptor who desires to make a mark for himself can quietly go to work in his studio, can elaborate a fine art production without the help of any one save himself, suddenly exposing it to the critical view of fellow-artists, and spring, Minerva-like, full fledged upon the artistic world. An architect, however, no matter what his degree of talent or capability may be, must first of all have opportunity to show his worth. He can not create the opportunity, for drawings do not constitute architecture, and until he has found some one confiding enough to take chances and entrust an important building to a young man of untried capabilities, he is unable to demonstrate that he can win even his bread, much less his butter. I know of no profession which is more ennobling, if pursued rightly, which will lead to a higher degree of culture, or is more truly self-contained, holding within itself the opportunities for study and recreation, for practical industry and enthusiastic enjoyment, than architecture. And, also, there is scarcely a profession in which the rich prizes are harder to acquire or demand such a combination of talent. Every man looks forward to winning these rich prizes. Few really get them. It is worth a young man's while sometimes to sit down quietly and look at architecture from a purely mercenary view, trying to see how he can get the great opportunities and in what way his work will command the highest pecuniary rewards. This science of getting work is something which is not taught in schools. There is as yet no Department of Applied Money-making, and while each young man generally has to work out his own lines and cannot depend very largely upon the experience of others, there certainly are some general possibilities which have been made manifest as the result of experience as aids to a young man in accomplishing the very important factor of bread-winning.

The young architect, when released from school, first enters the large army of draughtsmen and undergoes the ordeal of continuous office drudgery. This is a very thorough sifting process by which the survival of the fittest is aptly illustrated, for of the thousands of young men who are toiling in architect's offices, a small percentage only reach the dignity of architect. But in the course of time, the young man whose staying powers are sufficiently strong finds some confiding friend or relative who entrusts to him the erection of some building, usually a small dwelling, rarely an important public building. Then he hires a sign-painter and blossoms out as an architect. He finds the first year hard, the second year exceedingly hard, and it is only after at least two years and sometimes more, that he feels sufficiently established in his profession to be sure of remaining in it through seasons of mild depression. Then comes the real experience in getting work. To the superficial observer, the most potent factor in helping an architect to his opportunities is rich and numerous relatives. When viewed in the light of the success of some architects, a second important element seems to be "bluff," pure and simple; the ability of imposing one's self on would-be clients, the faculty of making people think you are a good fellow and understand your business. A third help, which is often advised for young men, is the cultivation of social relations, bringing one's self into prominence before one's fellow-beings in social intercourse. And the fourth way is by persistent advertising, either in the way of published drawings or notices in the papers through kindness of friends. Now, architecture would indeed be a mercenary profession and worthy of little real honor if individual advancement depended upon such unworthy factors as these. There is no questioning the advantage of all of these as adjuncts. Each has its proper place, each contributes to the architect's personal advancement as well as to his pecuniary advantage, and has its proper function in self-development and professional growth. But architecture is more than these, and the man who is really to receive the rich prizes must have something more to recommend him than relatives, must possess more intrinsic qualities than bluff, and must have a stronger hold upon the community than can be acquired by social intercourse. He who means to rise to the top of the profession must, first and last, continually, at all times, follow the advice that was given the young man who asked a celebrated speaker as to what were the secrets of success, and was told that the first was preparation, the second was preparation, and the third was preparation. The man who depends upon extraneous or adventitious helps will sooner or later find that he is left in the race, and that the rich chances are not going to him but to the man who is thoroughly prepared, the man who is able to handle a large problem because he knows how, not because he has friends. There are plenty of opportunities everywhere, and when a young man is really ready for them he will not fail for lack of the chance. Therefore, in architecture as in every other department of industry, the first bread-winning requisite is thorough preparation.

Now let us consider what preparation means, and, understand, we are speaking now in a purely mercenary spirit and are viewing architecture simply as a means of winning bread and butter. And let us also be understood that many are called, but few are chosen, and that the personal equation always counts for a great deal in an artistic pursuit. By mere volition a man may not necessarily become an architect. There is an essential spark which is found to enter into the composition of every successful architect, and achievement is pretty fairly measured by the extent to which that spark is nurtured and tended until it develops into a flame which can fire men's souls. So that preparation means more than mathematics or the handling of a jack-plane, and simply as a matter of dollars and cents, the architect who would be successful must be, first and always, an artist. If he is not, if his preparation impels him to in any measure disregard his art, he may have irreproachable business methods, he may be the best constructor in the world, and may be able to hire all the artists in christendom to lend him ideas wherewith to clothe his dry bones, but sooner or later the public will find him out, will measure him for his just worth, and when the great opportunities arise they will be given to men who are able to do their work themselves. This is not sentiment: it is fact. Witness Violet-le-Duc, who was everything but an artist in his profession, and who, notwithstanding his brilliant success as a writer and a draughtsman, was not able to earn his living as an architect, and never had the creation of a single important building entrusted to him. Witness, on the other hand, the World's Fair last summer. The architects, who were especially honored and given the largest commissions were not the men who had the largest social connections or the greatest amount of personal magnetism, nor were they the most successful constructors, but were a selection of the best artists that this country has produced. There is no more common mistake made by young men entering architecture than to suppose that real artistic ability, as

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such, does not count in a purely mercenary way, that it does not pay first and foremostly to be an artist in one's profession.

But while art is the first necessity of architectural bread-winning, there are other qualities which are very essential. The architect who expects large commissions must also have good business habits, be able to keep up the odds and ends of the tiresome minutiæ which are so inseparable from all building relations of any magnitude, must be able to keep the financial side of architecture in proper order, and be able to handle and direct his employés, whether actually in his office or indirectly employed around a building. And then, last in economic necessity, the successful architect must have a thorough scientific education. There is seldom a lack of this on the part of graduates from schools. Its absence is a very common failing with the so-called self-made men who have graduated from architects' offices. A hand-book and tables of beams and columns are not sufficient to teach construction, and a young architect who is to seriously compete for the great prizes must know how to scientifically construct his buildings.

Then beyond these three, which are really indispensable, there comes a fourth element, sometimes and in some emergencies quite as necessary, which is always displayed in a very marked degree by the successful architect, and that is common-sense; that indefinite quality which is so hard to define and yet which is so thoroughly appreciated by every one, whether applied to pure art, to dry business methods or to practical construction. The faculty to do things as they ought to be done, to design in a reasonable, appreciative manner, to carry on business in a logical, systematic way, to construct sensibly and without waste, all these are involved in common-sense as applied to architecture, besides which there is the common-sense which should be developed in intercourse with clients and with men, the common-sense which makes a man feel the importance of giving his client what he wants, rather than only what he thinks he wants.

Therefore, still considering architecture in a purely mercenary way, it pays to do the best work. It pays to be thoroughly prepared and equipped. Honesty is the best policy in every respect as a financial investment, and he who wins the most money in the profession and plans the most important buildings is not he to whom most has been forgiven, is not the man whose sins against good taste are pardoned because he is a good fellow, or whose badly-constructed buildings are condoned because of his relatives' influence, but is he who best serves the community. That this is fact and not theory, is becoming more apparent every year. The community is not composed entirely of fools. The general average of intelligence is quite equal to that of the average architect, and though bluff and influence may seem to count sometimes, in the long run the public will find out the difference, and with very few exceptions, looking over this country, it can be seen that the great buildings, the great opportunities, have fallen to the architects who are the best prepared in their profession.

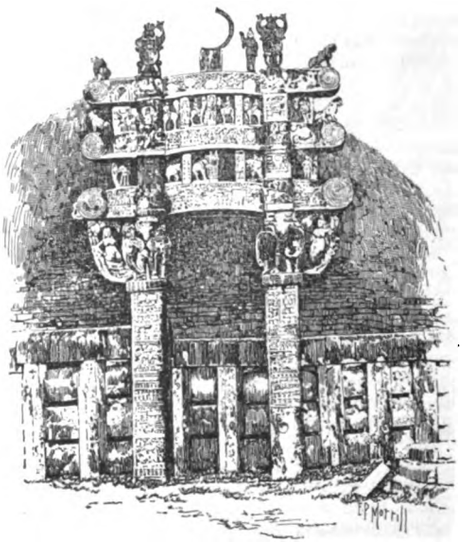
It is not always easy, however, for the young man just out of college, or just entering architectural business life, to know how to begin his post-graduate preparation. He may have his own ideals and it may take some time to have them adjusted and straightened to the necessities of business and of practical art. Let it be remembered in this connection that the line of progress in art or science is always along the line of least resistance. If we find in dealing with the world that our way is hard, that we are not received as we think we ought to be, it behooves us to look very carefully to see if we are right ourselves, and in most cases I will venture to assume that the trouble has been on our side rather than with the world. We need the world a great deal more than the world needs us, and it is no use for us to try to impose our ideas upon others unless those ideas are right. Don't give up ideals. Don't surrender any part of one's individuality, but be sure that the ideals are real and earnest and that our individuality is not a selfish one. Be ready to give the world what it wants, not necessarily what it thinks it wants, but strive in dealing with other men to find what are their real wants, and to fit art, science and business to those necessities. Business success is not incompatible with high ideals, but is often in a direct pecuniary sense an immediate result of them.

But all natures are not alike. Some men seem to be particularly adapted for artistic pursuits, others for business, and others again are of scientific bent, but if a man has to choose between the three sides of professional life, it is financially better for him to devote himself to art first, because that cannot be hired; his second choice might be the business side, but if circumstances or personal limitations are such that one element must be neglected, the architect's bread and butter will suffer least in the long run by entrusting to subordinates the scientific side of his profession. There are, however, natures which can not fully develop any one of these lines, and there are others who are absolutely unable to take care of more than one. All men can not be ideal, neither can all be successful, I mean in a financial sense Is, therefore, the pure artist to starve, and the scientist to stagnate, while business tact rakes in the shekels? Most assuredly, if the artist or the scientist sits down and bemoans his sad fate, and does not try to infuse common-sense into his art or practical business into his science. Fortune always was a lazy goddess, and the architect who would win her greatest rewards must be wide-awake, keenly alive to all the possibilities of his profession, and must try with all the powers within him to be not only an artist, not only a good business man, but a good all-around architect.

The question naturally suggests itself, after all the labor and hard work of preparation, the years of preliminary toil when the architect has no career behind him and everything is in the future, Are the prizes, after all, worth the effort? No, most decidedly, if any one enters the profession with the idea of acquiring a fortune: most assuredly not, if a man considers architecture simply as a means of satisfying his personal wants. Yes, emphatically, if the architect is the artist he might be. There are thousands of half-way, poorly equipped and very poorly remunerated architects in this country. On the other hand, there are hundreds of bright, smart men, who have good opportunities, are able to show every year what they are worth, can gratify reasonably their æsthetic tastes, and are possessed of comfortable incomes. These are the men who are to be successful architects in a pecuniary sense. They are generally also the ones who win the broader success and who at the end of their careers have the satisfaction of looking back on a life well done, a race well run, and a task accomplished in a manner which has brought its own reward.— *C. H. Blackall, in the Technograph.*

THE SANCHI TOPE.

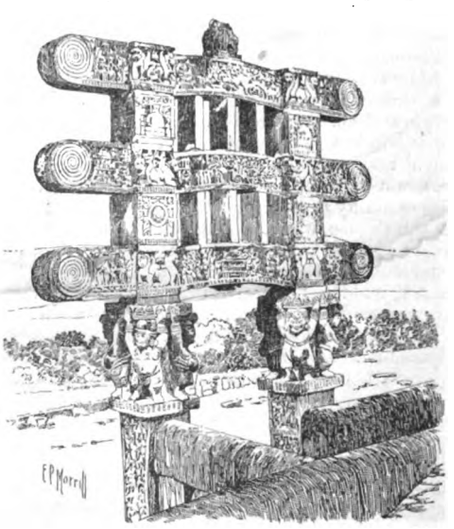
THE famous Sanchi Tope, in Bhopal, British India, is perhaps the most ancient and interesting of the Buddhist relics in the East. The word "tope" signifies a compact collection, whether of buildings or trees. In this case, it is used in relation to a mound. Central India was, in early times, a great stronghold of Buddhism.



The North Gate with Tope behind.

So substantial were all the temples and monuments erected by the adherents of that religion, that despite all the vicissitudes through which they have passed, the changing dynasties and antagonistic faiths of the rulers of the country, their remains are still abundant, and, to a large extent, in good preservation.

The town of Bhilsa, in the native State of Bhopal, gives its name



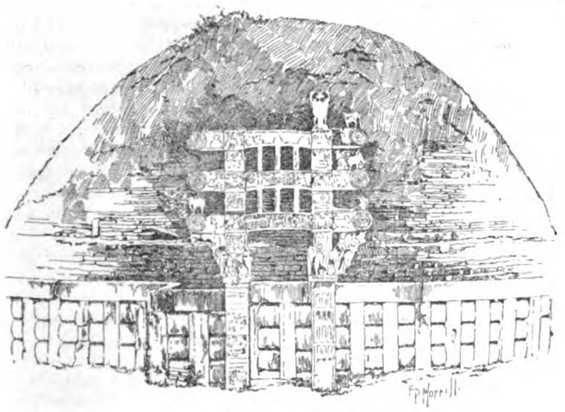
The South Gate.

to the surrounding topes, which thickly cover a district seventeen miles from east to west and six miles from north to south. These topes comprise about sixty-five individual sets, of which ten are in the neighborhood of Sanchi. Fergusson, in his well-known work

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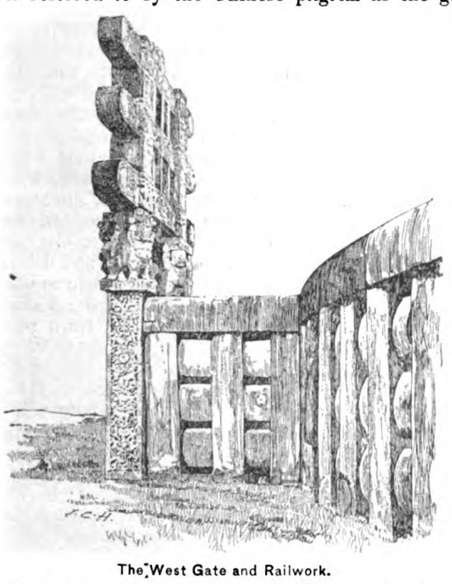
on "*Tree and Serpent Worship*," describes this series as "the most extensive, and, taking it altogether, the most interesting group of topes in India."

Sanchi is five miles south of Bhilsa. There was no city or town of that name; but there were large monastic establishments in the district, which gave wealth and prosperity to the surrounding neighborhood. The remains of embankments thrown across the valleys — the country around Sanchi being undulating — are thought to prove that the old-time Buddhist monks of this region were practical engineers, as well as agriculturists.

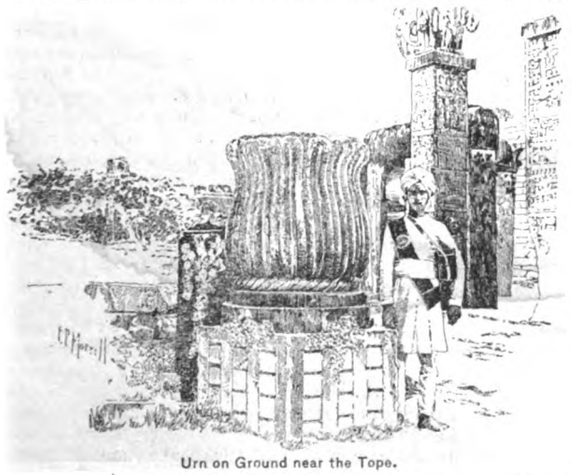


The Great Tope and East Gate.

Sanchi is referred to by the Chinese pilgrim as the great kingdom of "Sha-Chi." The great Tope of Sanchi, of which we give illustrations, occupies a commanding site on a hill. It consists of a basement, 121 feet in diameter and 14 feet high. On the top of this is a path, 5½ feet wide, within which the dome rises to a height of 39 feet. On the summit of the dome, there was formerly a level platform 34 feet across, surrounded by a circular railing of stones. Within this again was a square "Ter," consisting of 16 square pillars, 11 feet 6 inches each way, on which rested the golden umbrella, which always crowned these monuments. The superstructure has disappeared, but the shape of the massive mound remains unaltered.



The West Gate and Railwork.



Urn on Ground near the Tope.

Encircling the mound to a height of 7 feet from the ground, and 9½ feet from the base, is a remarkable railwork of stones dovetailed into upright pillars. There are 100 of these in all. Each was the gift of a different individual, as shown by the inscriptions on them. The whole is in a perfect condition of preservation.



Temple adjacent to the Tope.

Four gateways, on the north, south, east and west of the tope give access to the passage round the mound, inside the stone railwork. These gateways are covered with elaborately sculptured decorations, representing scenes in the life of Buddha, the Great Renunciation,



Upright Pillars: Remains of Temple.



Double-storied Temple adjacent to the Tope. Figure of Buddha inside.

and details of the Buddhist worship and ritual as they existed in the time of the renowned As-oka.

Of these gates, that on the north is the most perfect. It has an opening 7 feet wide between the two pillars. The height from

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the ground to the top of the central ornament is 33½ feet. The architecture of these gateways is exceedingly fine.

A study of the various incidents depicted on them is very interesting. Most of the figures are those of Hindoos and their dress is much the same as that worn at the present day. The worship of the tree and of the serpent is constantly represented in the sculpture. Eating, drinking and love-making are also given much prominence.

There is nothing in the inscriptions which gives any satisfactory clew to the period in which the gateways were erected. But it is pretty generally accepted that they were added to the original structure during the Christian Era, probably at the close of the first century, A. D. The Sanchi Tope itself is considered to have been raised some three or four hundred years before Christ.

There are two or three other topes on the hill, but they are small and have no sculptures or special points to attract notice. In the immediate vicinity of the great Tope are the remains of two or three temples, one of which, of two stories, contains a large stone image of Buddha. There are also to be found numerous relics scattered about the ground, amongst which is an immense urn.

J. B. Braddon.

Simla, India, June 3, 1895.

The Illustrations

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE FUGGER AND THE SCHNEKIN CHAPELS AT AUGSBURG.

[Issued with the International and Imperial Editions only.]

THE fine old city of Augsburg contains three chapels erected during the Middle Ages by the great and wealthy family of the Fuggers. The first "Fugger Chapel" forms a church for the great almshouse called "The Fuggerei"; the second is attached to the nave of the beautiful Church of SS. Afra and Ulrich; and the third is situated at the west end of the nave of the Church of St. Anne. The last-mentioned is the one which we illustrate.

The Church of St. Anne was built between the years 1472 and 1510, but was very much modernized when it was made over to the Lutherans after the treaty of Munster. One very singular alteration appears to have been made at this time; the high altar was removed from the east end, and a new one set up in the Fugger Chapel at the west end, forming that portion of the church into a quasi-chancel.

The walls of St. Anne's Church are covered externally and internally with plaster, and with the exception of the vaultings of the nave and aisles, no old work is now to be seen.

The Fugger Chapel was undoubtedly, before the alterations to which we have alluded, separated from the nave of the church by a screen, probably of metal; its floor is still raised two steps higher than the rest of the church. In the west wall of the chapel are four arched marble recesses, which are not in a line with each other, but form a very slight angle. These recesses are filled-in with richly-carved monumental reliefs of a very uncommon character, at any rate for Germany. They are in low-relief, and are executed in fine statuary marble. The two outer compositions represent the armorial bearings of the Fugger family, borne up by figures in Eastern costumes (a Persian and an Indian), in a building crowned by domed vaulting, the whole represented in perspective and filled-in with trophies, wreaths, allegorical figures, etc., in the Italian style of the earlier part of the sixteenth century. The two inner recesses are occupied by reliefs representing sarcophagi with recumbent figures resting upon them, and sacred subjects filling-in the upper portions of the arcades. One of these represents the Resurrection, but the other has been very much mutilated, and is not quite intelligible. Above these four recesses is a balustrade of marble, forming a gallery in which is a fine old organ with painted wings, with a little choir-organ in front, which also has painted wings. This organ is adorned with a good deal of excellent carving, and in the "shades" of the centre compartment are two angels bearing a tablet inscribed with the date 1512. The whole of this work — recesses, screen and organ — was built at the expense of three brothers of the Fugger family, and would appear to date between the years 1505[1] and 1512, which makes it very interesting, as it is probably the earliest example of pure Renaissance design in Germany, no indication of Gothic influence being anywhere visible. There is a tradition that the organ was "designed by Holbein," and that the wings of the small choir-organ were painted by that master.

As, however, there were three Hans Holbeins, all Augsburg men, the probability is that, if any of them had anything to do with this organ, it was the *second*, not the third, who is so well known in England by his magnificent portraits; in fact, he could not have designed this work, which is dated 1512, as he was only fourteen years of age at the time.

The very fine paintings upon the shutters of the great organ are by Hans Burgkmair, one of the most celebrated of the Augsburg school of painters of the earlier part of the sixteenth century.

The sculptured reliefs in the recesses of the screen are said to be the work of "Candido," or de Witte (the former being simply an Italianization of the German "Witte"). Be this as it may, there can be no doubt whatever that these carvings are either by an Italian, or a German who had studied in Italy. A most curious proof of this is furnished by the fact that, in the perspectives introduced into the side panels, iron ties are represented at the springing of the vaultings. Now, no German or Frenchman would ever have done this, unless, as was the case with "Candido," he had received his art-training in Italy. We are unfortunately unable to find out for certain who it was that really executed these fine works, nor are we sure whether the "Candido," referred to is the same man who executed some works at the old palace in Munich and at Landshut. There is a good deal of very interesting Early Renaissance work in Augsburg which is of a very different character to that generally found in Germany, and it looks as though it were the work of Italians, or possibly of Germans who had been brought up in Italy. Now it is known that "Candido," studied in Italy, but his works at Munich, and in Castle Transnichts, at Landshut, singularly enough, are less Italian in character than the Fugger monuments at Augsburg, and it has struck me that it is probable that just as there were three Holbeins and two Burgkmairs in Augsburg, there may have been two Candidos — if a Candido was really the sculptor of the work in the Fugger Chapel.

Now we come to the singular fact that five years later than the Fugger Chapel another great and wealthy family in Augsburg, the Schnekins, were erecting at the church of SS. Afra and Ulrich, in the same city, a monumental chapel of the most opposite character — that is to say, a building in quite pure Gothic style, without any admixture of Renaissance — so that here we have two wealthy families, one employing an architect to erect a purely Italian chapel, and another patronizing an architect who was working in the pure Gothic style, just as we find things going on at the present day. The altar of the Schnekin Chapel is dated 1517, and the chapel is over the sacristy, on the north side of the choir of the church of SS. Afra and Ulrich. By rights we ought to specify that it is the "Catholic parish church of SS. Afra and Ulrich," because there is a Protestant parish church of the same dedication, which leads to considerable confusion in describing the churches, and even the indefatigable Kugler, in his "Kunstgeschichte," indexes this very church incorrectly, naming it as *two distinct churches*, one dedicated to St. Afra and the other to St. Ulrich. There *are* certainly two churches, but both are dedicated to SS. Afra and Ulrich, and the only possible way of distinguishing them is to state to which religion the one in question belongs.[2] The (Catholic) parish church of SS. Afra and Ulrich is a very noble example of a third pointed tower church of grand dimensions, 318 feet long, 94 feet wide (over nave and aisles), and 100 feet to the crown of the vaulting. The nave was commenced in 1476, by an architect named Hans Luitpold, but the choir was not begun until the year 1500, under the celebrated architect and sculptor, Burkost Engleberger, who also designed the aisles and pulpit of Ulm Cathedral. No doubt Engleberger's work included the Schnekin Chapel, which must have been very little later than the choir, but was completed earlier than the latter, which was not entirely finished until the close of the sixteenth century. The Schnekin Chapel, however, was certainly finished in 1517, as the beautiful altar bears that date. The reredos is a very fine work, carved in pine-wood, gilt and painted. The triptych is rather singular in arrangement, as the doors have very long hinges, so that the extreme outside statues and canopies are seen whether the doors are open or closed; in the former case, they show between the hinges, and in the latter outside the doors. There is another feature which we have met with elsewhere, and that is the glazing of the little window-like piercings behind the figures and under the canopies. The saints represented are as follows, commencing at the top: 1. St. John the Baptist, to whom the chapel is dedicated; 2. St. John baptising our Lord; 3, 4, 5 and 6. Angels bearing emblems of the Passion; 7 (in centre). Madonna and Child; 8. St. Catherine; 9. St. Afra; 10. St. Ulrich; 11. St. Anthony; 12. St. Ulrich; 13. St. Rock; 14. St. Boniface. The pictures on the wings or doors represent the Annunciation, the Presentation, the Nativity and the Judgment of Solomon; but these have unfortunately been so abominably retouched, some seventy or eighty years back, as to be ruined. The altar itself is perfectly plain, with a moulded "mensa" and an arched perforation in the centre. The work is attributed, and, I think, correctly, to Tilman Riemenschneider, of Wurzburg, as there are more than one singularity of treatment in common between this and Riemenschneider's altar at Rothenburg, in addition to which, the figures, allowing for difference of material, greatly resemble those on the columns of the Marienkapelle, at Wurzburg, the tomb of St. Henry at Bamberg, and the monument of Bishop Scherenberg (illustrated in the *Builder* a few years back) in the Cathedral at Wurzburg.

The entire absence of any kind of Classical ornament from the details of this altar is very singular when we consider its date, 1517, and the fact that the Fugger Chapel, which was certainly completed five years earlier, is quite as purely Renaissance and free from Gothic detail. These examples of two distinct styles of architecture

[1] This is an "obit date," so probably the work is rather later.

[2] Baedeker speaks of a "Protestant and a Catholic Church, both dedicated to St. Ulrich," which is also incorrect.

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being carried on at the same time, serve to show that the present architectural practice can derive some countenance from that of the Middle Ages; and very likely if we knew all, we should find that architects' patrons in the Middle Ages did not differ very much from those of the present day, and were just as full of whims and fancies. *H. W. Brewer, in the Builder.*

ORGAN CASE, ST. SAVIOR'S CHURCH, SOUTHWALK.
[Issued with the International and Imperial Editions only.]

THE proper position for the organ in this church, after the rebuilding of the nave, was for a considerable time a matter of animated discussion.

Many suggestions were made, and models were even erected, but it was ultimately agreed that there was no place for it within the church which was not open to grave objections, either acoustic or architectural. No alternative remained but the erection of an organ-chamber — in many ways an unsatisfactory expedient, but in this case inevitable.

The only place for it was the angle between the east wall of the south transept and the south choir-aisle on part of the site of the chapel of St. Mary Magdalen, which was pulled down in the early part of the present century. Two arches in the choir-aisle and one in the transept, formerly opening into this chapel, have been cleared out without interference with any ancient work, and it is in front of the latter that the case shown in the drawing will be erected.

The organist's console will be immediately behind the choir-stalls on the south side.

The organ is being built by Messrs. T. C. Lewis & Co., and, together with the organ-chamber, is the gift of Mrs. Courage of Queen's Gate, as a memorial to her husband.

The drawing was exhibited in the Royal Academy and is here copied from the *Builder*.

SOUTH TOWER OF THE CATHEDRAL OF TOURS.
[Issued with the International and Imperial Editions only.]

THIS plate is copied from *L'Architecture*.

UNIVERSITY AND TERRITORIAL LIBRARY, STRASBURG, GERMANY. PROF. S. NECKELMANN, ARCHITECT, STUTTGART, GERMANY.
[Issued with the International and Imperial Editions only.]

THIS plate is copied from *Architektonische Rundschau*.

OFFICE-BUILDING, 60 STATE STREET, BOSTON, MASS. MESSRS. CABOT, EVERETT & MEAD, ARCHITECTS, BOSTON, MASS.

RAPID TRANSIT (GIRDLE LINE) SYSTEM FOR NEW YORK CITY, DEVISED BY MR. ALFRED H. THORP, ARCHITECT, NEW YORK, N. Y.

FOR description, see article elsewhere in this issue.

[Additional Illustrations in the International Edition.]

SUFFOLK NATIONAL BANK BUILDING, 60 STATE STREET, BOSTON, MASS. MR. EDWARD C. CABOT, ARCHITECT, BOSTON, MASS.
[Gelatine Print.]

TEN years ago, this building might have been taken as typical of the architecture of the banking quarter on State Street, and as it is one of the latest to give place to the modern high office-building, it seems worth while at this time to make a record of a type of building and phase of architecture which have lived their day.

PAINTED PANELS FOR A DINING-ROOM, BY THE LATE M. MAZEROLLE.

NORTHEASTERN STATION HOTEL, NEWCASTLE, ENG. MR. WILLIAM BELL, ARCHITECT.

THE NEW HOUSE OF THE BERLIN CLUB, BERLIN, PRUSSIA.

IN connection with our series dealing with American club-houses, a study of this new German club-house should prove interesting. The plate is copied from the *Deutsche Bauzeitung*.

THE DRAWING-ROOM: HALL OF THE GROCERS' COMPANY, LONDON, ENG. MR. H. C. BOYES, ARCHITECT.

THE chimney-pieces are executed in alabaster and marble. The frieze was modelled by Mr. G. Seale. The plate is copied from the *Building News*.

OLD HOUSES AT BRUGES, BELGIUM.

THIS illustration is copied from *L'Emulation*.

COTTAGES IN THE BLACK FOREST.

THIS plate is copied from the *Zeitschrift für Bauwesen*.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE RIMINGTON COLOR ORGAN.

35 ALBANY ST., LONDON, N. W., August 5, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — From your account of Mr. Rimington's color organ, I fancy you think that the instrument plays the music as well as the colors. This is not so. The organ is played as a dumb-piano might be, while some one else plays a piano, or at times we had the orchestra.

I believe the idea is, that supposing any one were so skilful in the colors as to be able to follow it as a very clever musician may a full score — the pleasure would be the same *as hearing music*. But how many musicians really get the same pleasure from the score as from the sounds?

The effect of colors was charming, but monotonous; the combination to me (being a musician) most distracting. I hold that if one gets pleasure from music while some lovely sunset is playing before one's eyes, one need not really observe the sky much — and *vice versa*. Can one take in two things at once? Opera? Yes. But, as a fact, do you not observe scenery, action and so on, slightly, if you attend to the music intellectually? Could you tell next day the color of a gown, if you were wrapped up in the music? It is really one harmonious whole. Whereas Mr. Rimington's effects change so rapidly and dodge about so — in a slow note the color remains, but a trill is most confusing — that to me it was most distracting. If you want to try the effect, put your hand on your gas or lamp screw and turn it suddenly up and down. At last it made my head ache so, I ran away! I think, perhaps, you may like these personal notes upon a very interesting subject. S. BEALE.

ASH-CONCRETE FILLING.

NEW YORK, N. Y., August 22, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In a recent article in speaking of fireproof material and of the experiments about to be made by a joint committee from several societies in this city, Mr. Alex. Rice McKim calls attention to the ash-concrete filling of floors. He says, "In my opinion there is too much of this used altogether. By filling up the space between the tile and (wood) flooring, as is usually done, air is excluded, and the sleepers and under-flooring decay more rapidly than otherwise; moisture from this mass of concrete penetrates the tile arch and stains the plaster; and the dead weight of the floor is materially increased.

"The beams, of course, should be entirely encased by concrete and tile, so as to protect them as far as possible from fire; but wooden floors can be carried to better advantage entirely by the sleepers, which need be but 4" deep and can be notched if necessary, and with as little material in between the beams as possible."

I think many of the architects who have looked into this subject will agree with Mr. McKim in the above.

Yours truly, ARCHITECT.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

SALT-WATER SUPPLY IN SAN FRANCISCO. — The recent disastrous fire in San Francisco, when $1,000,000 worth of property was destroyed, shows the lack of a proper system of fire-protection. The water-pressure was altogether too low. With a view to remedying this evil, which is recognized by the authorities, the Olympic Salt Water Company of San Francisco, has for some months past been laying its mains, and intends to bid for the patronage of the city. The Company proposes to offer the city free of cost all the salt water needed for sprinkling purposes in the section where their mains are laid and their

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hydrants set. Fighting fire with salt water is not an experiment, but has been successfully used in England for years. It has been proved beyond question that salt water is best adapted for fire purposes, and there are several reasons why this is so. First, the density of the water does not allow it to evaporate so readily, thus allowing it a longer period to get in its destroying power. Again, salt water weighs sixty-four pounds to the cubic foot, as against sixty-two pounds for fresh water. The difference, of course, is found in the salt. It is claimed that one service of salt water is equal to three in fresh. Returns from seventeen English cities where salt water is used for sprinkling purposes show that the streets have gradually become macadamized. The mortality has also decreased from twenty to thirty per cent. The Olympic Company has a reservoir with an elevation of 320 feet above the city. The reservoir is on Point Lobos Avenue, near Josephine Street and has a capacity of 4,500,000 gallons. — *Fire and Water.*

The Highest Trees in the World. — In the Victorian State Forest, on the slopes of the mountains dividing Gipps Land from the rest of the Australian colony of Victoria, grow the highest trees in the world, the noble gum trees of the genus eucalyptus. These trees range from 350 feet to 500 feet in height. One of the huge trees that had fallen was found, by actual measurement with a tape, to be 438 feet from the roots to where the trunk had been broken off by the fall, and at that point the tree was 3 feet in diameter. A cedar tree recently felled near Acosta, Wash., measured 407 feet in height and 70 feet in circumference. Dr. James gives some interesting particulars of these gum trees. The eucalyptus globulus grew 40 feet high in four years, in Florida, with the stem a foot in diameter. Trees of the same species in Guatemala grew 120 feet in twelve years, and had a stem diameter of 9 feet. Other species also attain enormous sizes — eucalyptus diversicolor is know to grow 400 feet high, and trees have been measured 300 feet long without a branch. Boards 12 feet wide can frequently be obtained. In 1800 a monster petrified tree was found in Baker County, Oregon. It was just 666 feet long, and at its butt was quite 60 feet in diameter. Amber-like beads of petrified gum adhered to the sides of the trunk for a distance of 100 feet or more. — *London Tit-Bits.*

An Economy of Power. — A Chicago engineer, Prof. John P. Barrett, has originated a plan for combining the electric-lighting and water-supply systems of that city so as to gain a great economy of power. The electric-light plants require the use of dynamos for lighting purposes during those hours when there is the least demand for water. At night the great manufacturing plants are shut down and make but slight demands on the water-mains. In summer the demand for water is almost doubled, and during the same months less is required of a dynamo for lighting purposes. In the heated season it is not necessary to turn on the current for street-lighting until after all lawns are sprinkled and the 10,000 steam plants of Chicago have ceased drawing water from the mains. In the winter months there is not so much trouble with the water-supply, and less is required to make up the deficit of pressure. Prof. Barrett proposes to connect the great dynamos in the four electric-light plants belonging to the city with electric-motors, which will furnish power to such minor pumping-stations as the water-department may decide to establish. For the operation of the smaller pumping or re-inforcement stations he proposes two plans: The first is to operate with the pump directly on the mains with what may be termed a "run-around." The pump would then create a suction from the direction of the main pumping-station and exert a force in the other and opposite direction. The second plan is to erect a water-tower, pump the water through the pipes from the direction of the tunnel, and force it into the tower. The dynamos could be connected with a float in the tower which would operate a governor or regulator, by means of which the height of the water would regulate the speed and capacity of the pump. In this way the system would be automatic and self-regulating. — *N. Y. Evening Post.*

A Big Church to be moved Bodily. — If the building-mover who signs the contract to move Immanuel Baptist Church, Michigan Avenue, near Twenty-third Street, successfully performs the work he will have done one of the most remarkable feats of building-moving ever known. The contract calls for the moving of the church in its entirety fifty feet south and nine feet east, and it is an undertaking well covered with risks. Immanuel Church is built of stone, has a self-supporting roof, and to the eye of a builder has the appearance of a big nutshell. There is a sixty-five-foot steeple on the top of this church. With all the risky features in connection with the project, there are two contractors willing to do the job and their bids on the work are now under consideration. When the idea of moving the massive hollow structure with its towering spire was first broached, it was laughed at by many, but the people who wanted the church moved knew what they were talking about. These were the proprietors of a hotel, whose interest it was to have the edifice a little farther south, because it darkened all of the best rooms in the hostelry — those of the south exposure. The hotel company buys the fifty feet of property south of the church property from B. F. Jacob for $30,000, and deeds it to the Immanuel Church. It pays the expense of moving the church, its re-construction and re-decorating. It is estimated that this part of the job will cost $65,000. The trustees of the church, in exchange for the property bought from Jacobs, relinquish to the hotel company the open fifty feet created by the removal of the church. The removal does not cost the church a cent. — *Chicago Tribune.*

Lowering the St. Lawrence River Level. — The Canadian Government is worried over the effect of the Chicago drainage-canal upon the level of the St. Lawrence River, whose present low water, it is feared, will be rendered still lower by the opening of the canal. It is pointed out by the Dominion authorities that in 1881 they deepened the rapids below Ogdensburg from ten to sixteen feet, which added from six to eight per cent of water to the free channel. There was feared that the level of Lake Ontario would be considerably lowered, and finally the matter was investigated by General Comstock and Colonel McFarland, of the United States Army Engineer Department. The conclusion was that the effects would extend to no great distance, and that the level of Lake Ontario would not be impaired. Similar cases are presented by the Lime Kiln crossing of the Detroit River and at the St. Clair flats. It was shown that the level was not affected in 1881, and that the water-level at Niagara Falls will be lowered from two and one-half to five inches — probably not more than four inches. If there is four inches of difference at Niagara, there will, therefore, be still less change at the St. Lawrence rapids. In fact, the actual variations from change of wind and barometer are greater. A strong south-west wind will cause the level of Lake Michigan to vary as much as eighteen inches within twenty minutes. The Chicago canal will connect the lakes with the Illinois River, and so with the Mississippi and the Gulf of Mexico. — *Fire and Water.*

The Clay Industry. — For the first time in its history, the extent of the clay-working industry will be thoroughly given in the forthcoming report of the Geological Survey. Information gathered by the survey officials from representatives of over 14,000 firms and individuals employed in the business leads them to place value of over $65,000,000 upon the clay products of the United States for 1894. The census compilation made the value of the product in 1890, $67,000,000. Fifty-three per cent of the product in 1894 was in bricks, over six billions being accounted for There were enough of them to make a walk over eleven feet wide all around the globe. Ohio stands at the head of the States in clay manufacture, its product being valued at $10,668,000, or over 16 per cent of that of the whole country. Illinois comes next with 13 per cent, Pennsylvania 11 per cent, New York 8 per cent, New Jersey 6 per cent, Indiana 5 per cent, Missouri and Iowa 4 per cent, Massachusetts and Michigan 3½ per cent, Maryland, Wisconsin and Minnesota 2 per cent. The largest deposits of asphalt known are found in California, Utah, Oklahoma, Texas and Montana. That from Utah, the reports say, is the purest in the world, the total production in 1894 being valued at $353,000. Soapstone is found in all the Atlantic States, the principal deposits being in New York and North Carolina. The product for 1894 was valued at $401,000, an increase of about sixty per cent over 1893. — *Boston Transcript.*

Wind Velocities and Pressures. — Mr. E. F. Miller, in the *Proceedings* of the Engineers' Club of Philadelphia for April, gives a table of wind velocities observed by the United States Weather Bureau at Philadelphia. For calculating the pressure per square foot the equation used was: $P = 0.004\ V^2$. The table is as follows:

Highest velocity in the month of	Occurred in the years of	Velocity recorded by anemometer M. P. H.	Corrected velocity M. P. H.	Corresponding pressure per square foot.
January	1878 & 1885	52	42.2	7.13 lbs.
February	1876, '80, '86	48	39.3	6.18 "
March	1888	60	48	9.22 "
April	1879	50	40.8	6.67 "
May	1889	60	48	9.22 "
June	1889	46	37.8	5.72 "
July	1876	40	33.3	4.44 "
August	1893	55	44.4	7.89 "
September	1889	54	43.7	7.64 "
October	1876	75	58.7	13.74 "
November	1873	66	52.3	10.94 "
December	1876	63	50.2	10.08 "

Sacred Sewage. — For many years past a resident near Hampton Court has been complaining of the discharge of sewage from two drains into a small stream which passes his garden and enters the Thames just above the intake of one of the water companies. So long ago as 1888 the Conservators of the Thames called upon the sanitary authority in whose district the drains are, to prevent the pollution of the river. But, from that day to this, nothing has been done, owing to the fact that the chief offender is the Crown, and against the Crown no proceedings can be taken. The bigger of the two drains comes, it seems, from the Royal Mews. Its exalted source does not, however, make the sewage any the less offensive and poisonous; and I would humbly suggest that the privilege of creating a nuisance and polluting the water-supply of the metropolis might be voluntarily surrendered without any serious loss to the dignity and authority of the Crown. — *London Truth.*

The Plan of the Greek House. — The work carried out by M. Homolle adjacent to Delos has very much enlarged our knowledge of the domestic life of the Greeks, beside yielding many fine art objects. The *Athenaeum* says that the town in proximity with the harbor has the same interest as Pompeii possesses. We can now understand what was the plan of a Greek house, something we only knew theoretically by studying Vitruvius. The ground near to the harbor shows what must have been commercial warehouses and private dwellings. They have more than such decorations as of wall paintings and mosaic floors, and contain works of sculpture. This work at Delos promises great results, and there is the possibility of finding some masterpieces of Greek sculpture.

Molasses as a Paving Material. — E. Furke, the head chemist of a sugar refinery at Chino, Cal., has invented a queer pavement. It is made mostly of molasses, the kind used having been a refuse product hitherto believed to be utterly worthless. It is simply mixed with a certain kind of sand to about the consistency of asphalt, and laid like an asphalt pavement. The composition dries quickly, and becomes permanently hard. The heat of the sun, instead of softening it, makes the pavement harder and drier. A block of the composition successfully withstood repeated blows of a machine hammer, and showed no signs of bending or cracking. — *N. Y. Tribune.*

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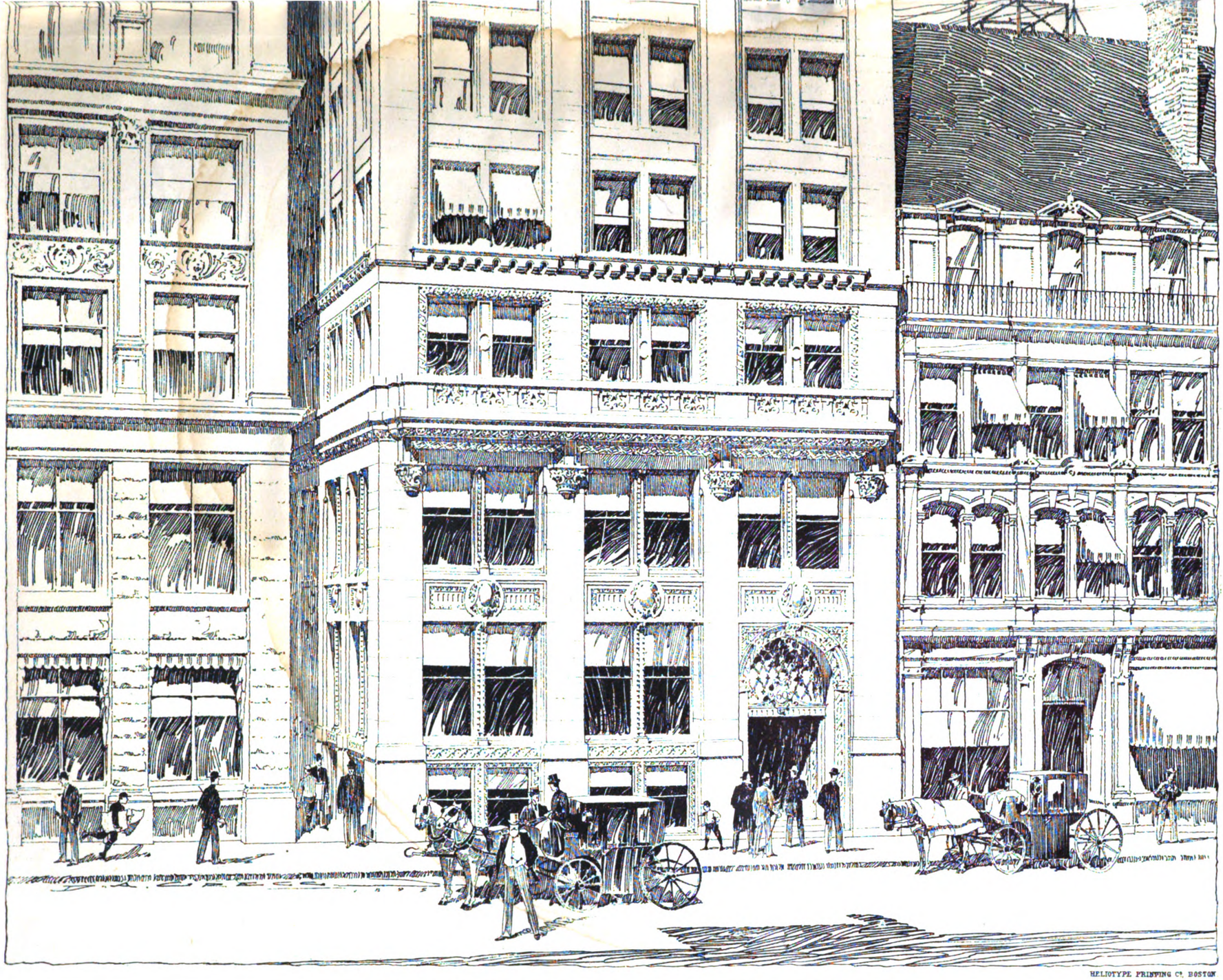
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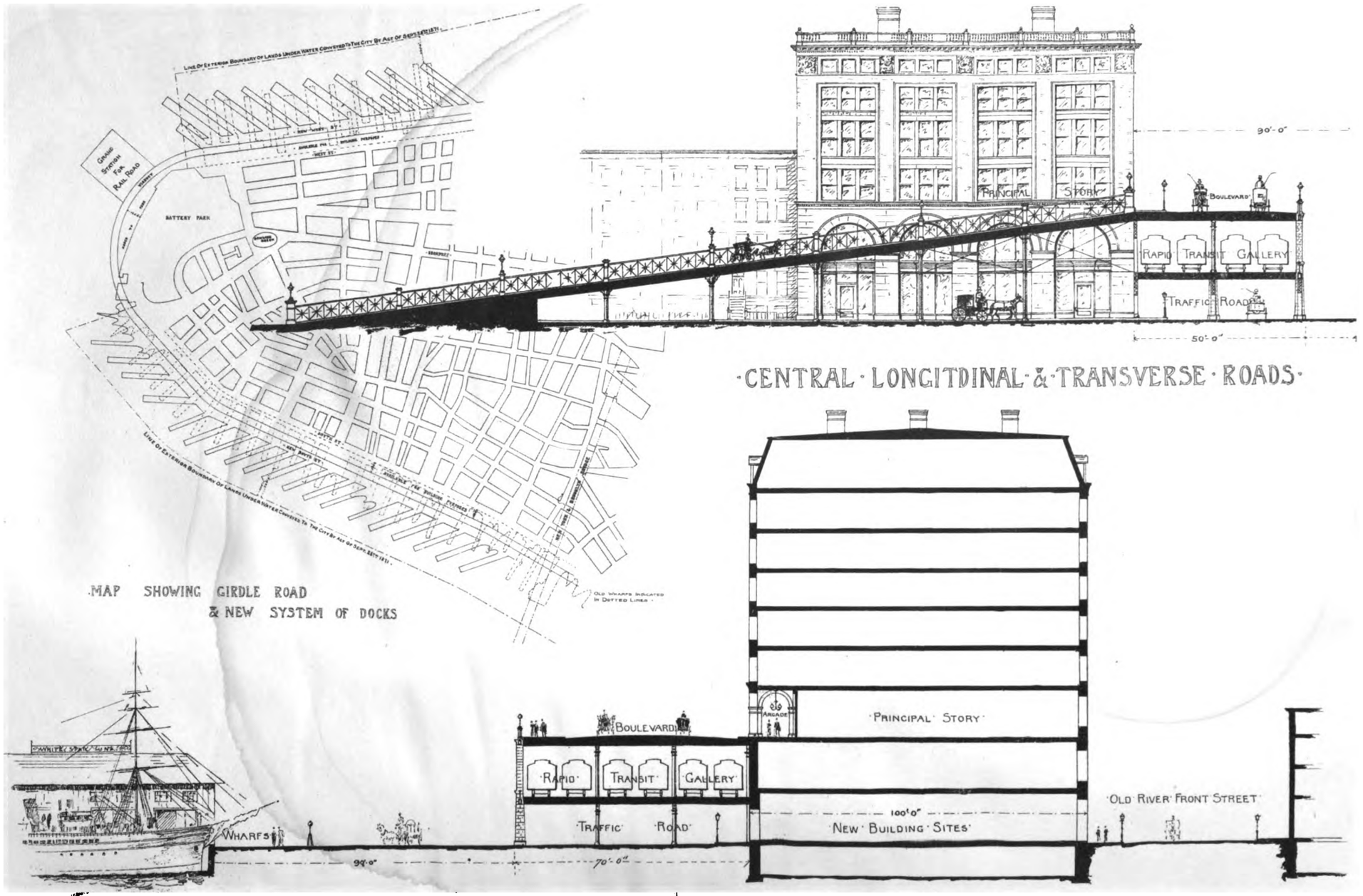
CABOT, EVERETT & MEAD, Architects.

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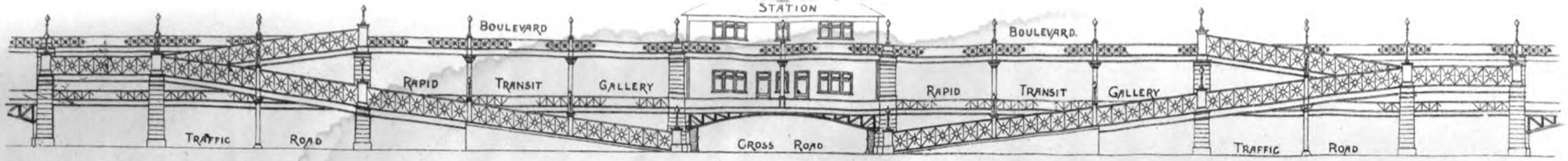
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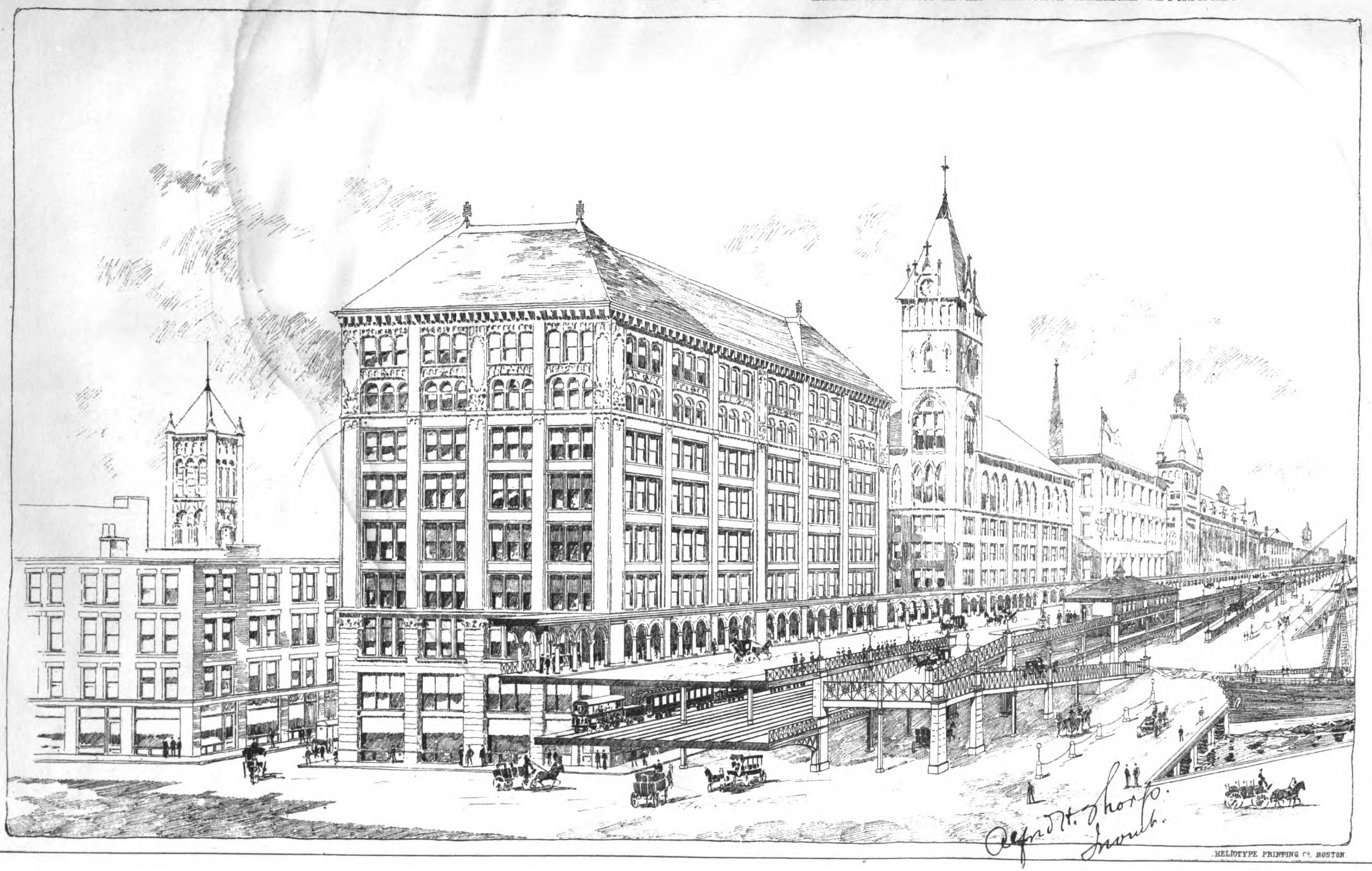
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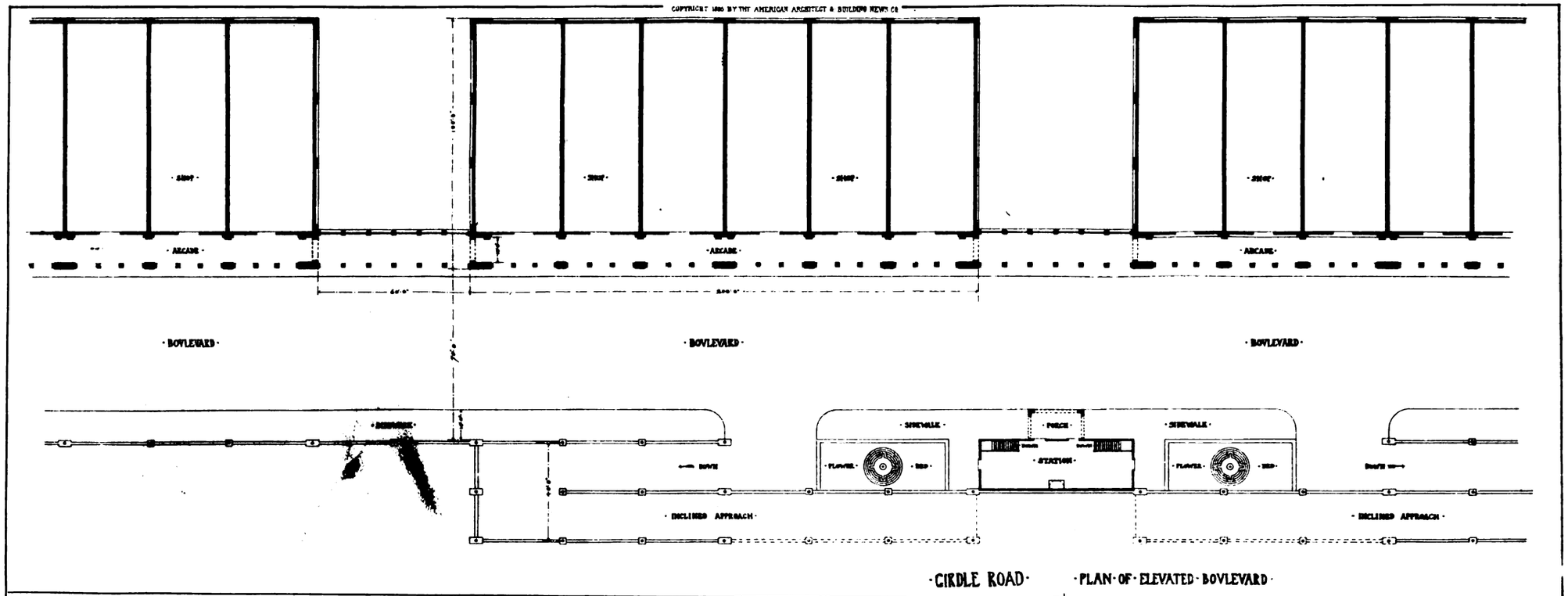
· VIEW OF GIRDLE ROAD FROM THE RIVER FRONT ·

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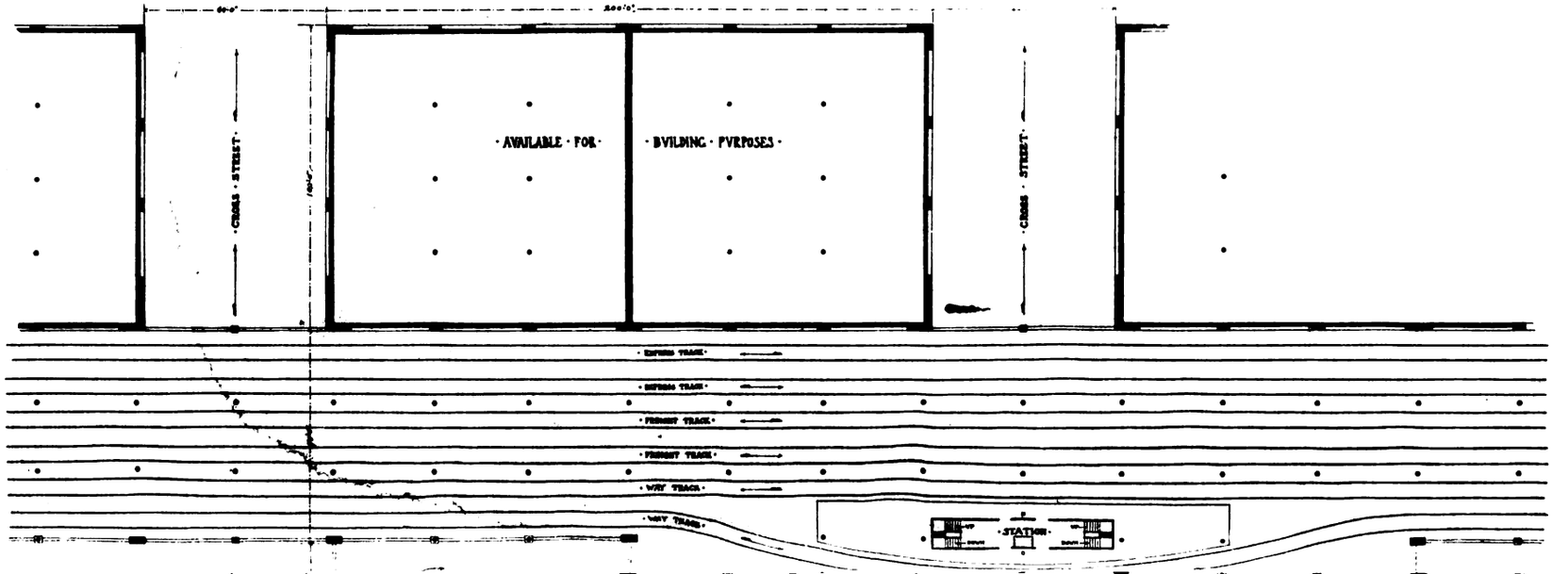
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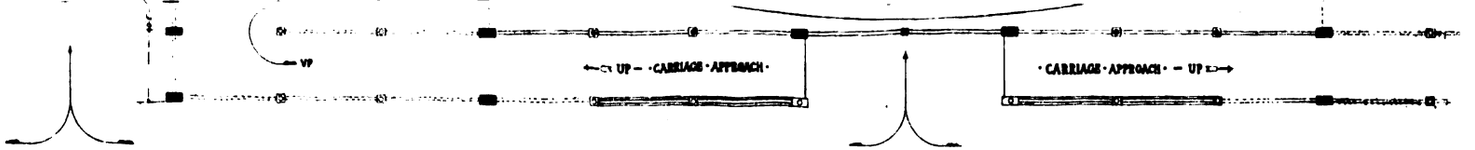
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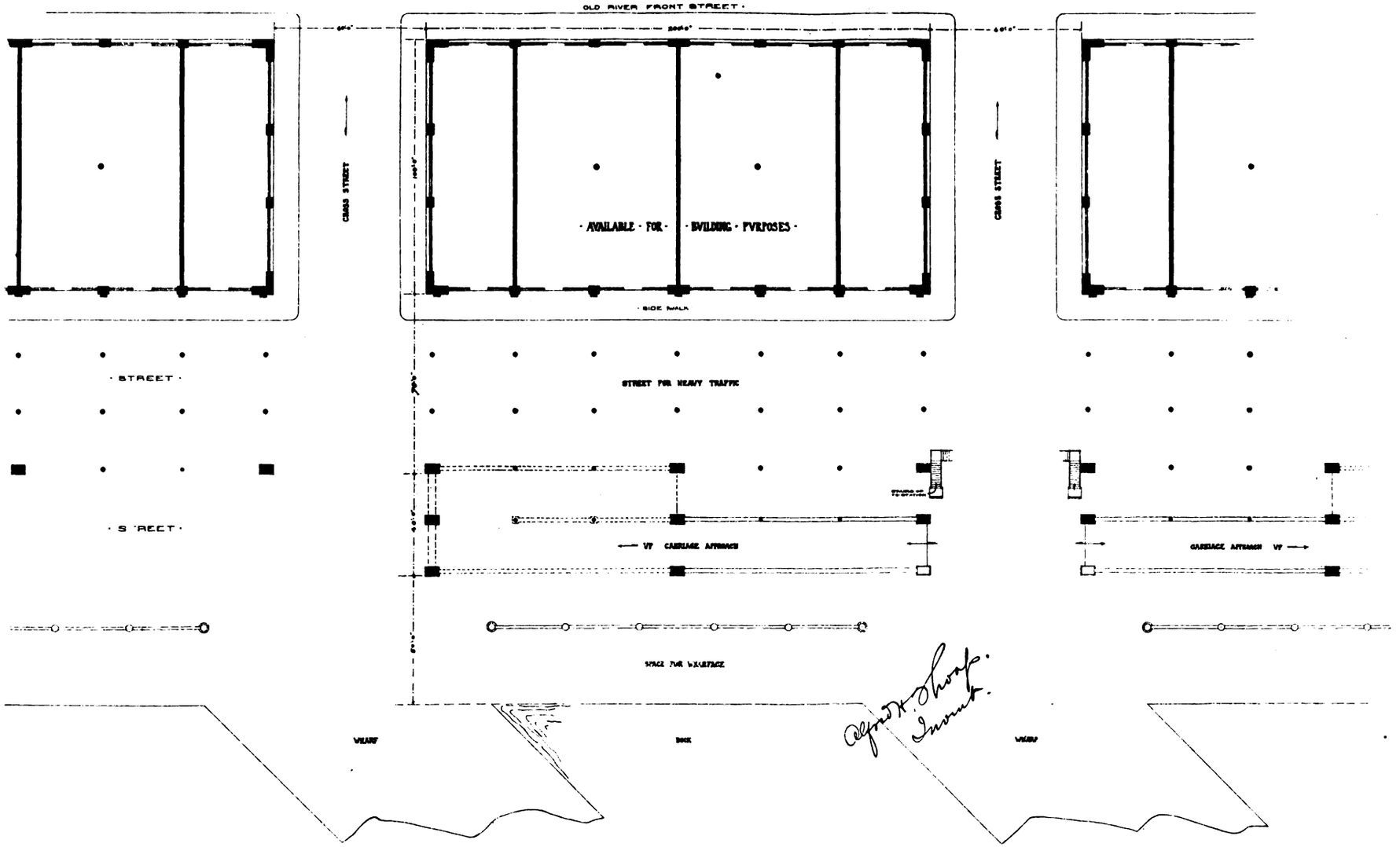
CIRCLE ROAD — PLAN OF ELEVATED BOULEVARD



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GIRDLE ROAD PLAN OF RAPID TRANSIT GALLERY SHOWING STATION & PLATFORM



GIRDLE ROAD PLAN AT STREET LEVEL

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Central Congregational Church, Newtonville, Mass. — House on Fifth Ave. and 62d St., New York, N. Y. — House at Buffalo, N. Y. — House at Newton Centre, Mass. — Proposed High School, Middletown, Conn. — Staircase-hall in Proposed House at Hartford, Conn. — House and Stable at Swampscott, Mass.
Additional: Interior of the Central Congregational Church, Newtonville, Mass. — Tower of the Same Church. — Messrs. Thos. Cook & Son's Commemorative Building, Leicester, Eng. — Dining-room, Great Cumberland Place, London, Eng. 103

EXHIBITIONS. 103

NOTES AND CLIPPINGS. 103

WE have before mentioned the suit of Mr. R. B. Eastman, a Brooklyn architect, against Kings County, to recover some eighteen thousand dollars, as compensation for services rendered in the preparation of designs for a group of buildings, — asylums and similar structures, at the request of the Board of Charities. After the plans were made, the cost of carrying them out was found to be so great that the idea was abandoned, and the architect's services seem to have been forgotten. Mr. Eastman asked several times for payment, but was repulsed. On one occasion, as the story goes, the commissioners asked him where the plans were that he wanted to be paid for, saying that they had never heard of any such plans. As at that very moment, the plans were hanging on the walls of the commissioners' office, Mr. Eastman seems to have concluded that the Board did not mean to pay him, and, four years after he had done the work, he commenced suit against the County for compensation, claiming two and one-half per cent on the estimated cost of carrying the plans into execution. As he had still in his possession a letter from the Chairman of the Board requesting him to make the designs, and another letter from the same person acknowledging the receipt of the drawings, there could be no doubt of his employment; and Justice Cullen, before whom the case was heard, decided that his claim was just and reasonable in every particular, and directed him to present the bill for payment to the Board of Supervisors. If they should refuse to pay it, the judge told Mr. Eastman to apply for a writ of mandamus to compel payment. The counsel for the Supervisors, however, advised them not to resist payment; and the bill was accordingly accepted, audited and paid, with interest. So far as Mr. Eastman is concerned, the final payment of the bill in full is certainly to be regarded as a gratifying testimony to the fairness and moderation of his demands, and the profession will see in the decision an evidence of the growing appreciation, by the Courts and the public, of the rights of architects.

THE foreign architectural journals devote a good deal of space to the late R. M. Hunt, whose death they regard as a loss to the art of the world. The *Builder*, particularly, gives an excellent account of his work in his native country, and of the influence that he has had over American architecture. As compared with Richardson, it considers that the latter was more original, and had, for the time, a greater influence; but it thinks that the Richardsonian style is going out of fashion, while that favored by Mr. Hunt, which was simply an intelligent application of French work, seems to gain in favor among American architects.

TO a certain extent, this comparison is a good one; but Richardson was, for some years, a member of the School of Fine-Arts, in Paris, and, like Hunt, worked for years in the office of a French Government architect; so that his training was as purely French as that of Hunt; and the difference in the way in which the two men developed their work was dependent, partly on their individual characters, and partly — much more, we think, than is generally supposed — on the influence of their *patrons* in the School. Richardson was a pupil of André, and no one, who knows the work of both, can help thinking that André, with Richardson's opportunities, would have done similar things. André's designs are full of "bigness," and "stuff," as Richardson used to call it: he delighted in a series of great round arches, such as Richardson afterwards was so fond of building; and, like Richardson, he loved something new, picturesque and striking, so far as picturesqueness and novelty could be obtained within the rather narrow limits of orthodox French design. With such ideas of roundness, massiveness and stability fixed in his mind by his master, it is not strange that Richardson, who had a very great knowledge of architectural precedent, and was familiar with the Romanesque received at the School of Fine-Arts as the proper style for ecclesiastical buildings, should have found in a development of that style his best expression; and his merit lies not so much in having, as the *Builder* says, tried to originate a new style, as in the skill and resource with which he adapted to new conditions one that he had been taught. Hunt's master, Lefuel, was an artist of very different stamp from André. He was ingenious and original in his combinations, but was quite satisfied with what antiquity and the Renaissance could furnish him in the way of precedents, without any of the yearnings for the ideal which characterized André. Hunt's earlier buildings in this country, such as the Lenox Library, and certain houses in New York, show the same characteristics; but Hunt was so constantly in communication with France, which he loved as a second mother-country, that the newest Parisian fashions in architecture were soon reflected in his work. A few years after his career in New York began, the Neo-Grec fever, introduced by Labrouste and his coterie, began to rage in France, and Hunt was soon inoculated, the Brimmer houses in Boston, the Osborne house in New York, and certain tombs and monuments, being his principal contributions to the new style. After this short-lived epidemic had passed away, he took up the style in which his best work was done — the French Late Gothic, or rather, Transition. Whether this was suggested to him by what he had seen in Paris, we do not know. The style has been used in Paris of late years in several instances, with great cleverness; but Hunt seems to have found an artistic satisfaction in it, similar to that which Richardson found in his Hispano-Auvergnat Romanesque, and he used its picturesque outlines, and contrasts of delicate detail and massive wall, with the most brilliant success. It is probably on the beautiful buildings in this style, such as the Vanderbilt and Goelet houses, that his public fame will mainly rest; but the profession will remember him as being, perhaps above all other American architects, a man who did everything well. Whether he had to design a Neo-Grec gravestone or a pedestal for a statue, consisting of a block of granite, with a few mouldings on it; a wooden house, a Broadway store, a hospital, a public library, a brick hotel or a marble palace, the result was always not only interesting and well studied, but impressed with that peculiar stamp which distinguished it in a moment from the work of all other architects.

MR. HENRY G. HARRISON, an architect once of considerable distinction in New York, died a short time ago, at the age of eighty-two. Although he designed a considerable number of important buildings in New York, including the Woman's Hospital, and the Manhattan Market, which was, at the time of its erection, one of the wonders of the town, he became particularly prominent through his connection with the magnificent schemes which the late A. T. Stewart attempted to carry out at Garden City, Long Island. Mr. Stewart had an idea that a great rural city, so to speak, could be established around a nucleus of fine public buildings, and he entrusted Mr. Harrison with the designing of the buildings. Of these, the principal was to be a cathedral, and the cathedral

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was really built and dedicated, but, of the other intended structures for public use, we believe that none was carried out, except certain school buildings. The cathedral, however, was, and still remains, a fine and costly structure, which will perpetuate, as it was intended to do, the memory of its founder, and, we hope, of its architect.

M. GABRIEL AUGUSTE ANCELOT, a distinguished French architect, and recently Professor in the Paris School of Fine Arts, died recently in Paris. He gained the Prize of Rome in 1851, and was elected to the Institute of France in 1892. His most important work is the new Museum of Arts and Manufactures.

IF Mr. Corthell's mathematical deductions can be held to be prophetic, the star of empire will have stopped moving westward before very long and have fixed its permanent home, about 1920, over Chicago, with its possible seven and three-quarter millions of inhabitants. When that time comes, it will probably be much easier than now for the American Institute of Architects holding an annual convention at St. Louis to secure a large number of attending members. Still, as a large number of present members will hardly feel in 1920 like taking the long trip from the Atlantic seaboard to the Mississippi Valley — even if means of transport are made wonderfully more expeditious and comfortable — it is worth while for Eastern architects to begin to lay their plans now so as to be able to attend the meetings that are to be held in St. Louis, October 15, 16 and 17. We do not know as yet what matters of importance are likely to come up for consideration, but these meetings are always liable to develop something which demands proper treatment, and proper treatment can hardly be had unless proper persons are present to handle it. For our own part, we rather favor the representation of Chapters by authorized delegations, with powers limited to the control of such matters as had been announced, for discussion at the annual meeting, at a sufficiently early date to enable the Chapters to discuss them and reach a primary decision on them before the questions should be laid before the general conclave. Few things are more exasperating than to observe how matters of importance have been brought before past conventions and disposed of by chance, either with or without the pretence of consideration. The constitution leaves the disposal of all matters at the discretion of those who happen to be present at the annual meetings, and yet the presence of members is an affair of the purest chance. Year after year the great proportion of the attendants at these meetings are found to be regular attendants, with a small admixture of new members and some who are willing to put in an appearance because the meeting happens to be held in their town of residence. If regular attendance were due in all cases to real interest in the proceedings, then a most admirable practice is in vogue; but we fancy that it is rather more the effect of mere habit than of real interest. Attendance at the meetings is by too many looked on as merely an incident of the annual vacation and as offering a chance of acquiring personal knowledge of a new and unstudied locality, and the considerate action on matters brought before the convention is held to be a very secondary matter. The men of influence and weight who are nominally in attendance are generally the men who are put on committees and are busied with committee work at the very time when their presence on the floor as debaters would be of most value, and many a matter is disposed of without discussion simply because those whom chance has brought together are timid and afraid of their own voices, are uninformed as to the bearings of the matter for want of previous discussion by their local Chapters, or are absolutely indifferent to the whole matter. Annual meetings, constituted as they have been in the past, with chance membership, are a mistake and are liable to do the same sort of mischief that is done by annual legislatures, and we believe it is a common and devout aspiration that legislatures of all kinds might be called together at less frequent intervals.

ONE of the matters that will probably come up for treatment is to determine whether or no the Institute shall recede from the position which it took, almost without the semblance of discussion, in its attempt to establish a closer control over Chapter membership. The ill-considered action hat was taken was at once resented in several directions. Amongst others the Boston Chapter refused to accept the conditions the Institute sought to impose, so that by strict interpretation there has been, we suppose, no Boston Chapter of the Institute during the current year, although the older body, the Boston Society of Architects — of which the Boston Chapter is an outgrowth — has been more active than ever, and the fact that it has been able to employ itself usefully is due to the fact that it can set its annual dues at any figure it pleases, instead of limiting them to the small sum that the Institute has attempted to fix as a maximum.

THE new French Society of the Social Museum, having been presented with a gift of thirty thousand dollars, has decided to expend one-third of it in sending missions to study social matters abroad; one-third in prizes to deserving workingmen, and the remainder in opening two competitions for essays on certain questions relating to the improvement of the lot of working people. Two of these competitions are now announced. The first is for essays on Profit-sharing, and the second for essays on Workingmen's Benefit Associations. For the best essay on each of these subjects a prize of five thousand dollars will be given. Any person may compete for either or both prizes; but all essays submitted must be written in French. The essays on Profit-sharing must be submitted before December 31, 1896, and those on Workingmen's Benefit Associations before December 31, 1897. All papers must be delivered at the office of the Society of the Musée Social, 5 Rue Las-Cases, Paris.

WE are just beginning to appreciate in this country the resources and enterprise of Japan, which has been well called "the Great Britain of Asia." Like Great Britain, Japan possesses large deposits of coal, and has discovered how to utilize them, the annual production being not far from four million tons. Gold is found in moderate quantity, about half a million dollars being the usual annual output; silver is produced in somewhat larger quantity, while copper and lead are hardly worked at all, although mines of these metals exist. Unlike England, which has its mines of coal and iron almost side by side, Japan produces as yet very little iron. Sulphur is found in the volcanic region, and brought in considerable quantities to the market; and graphite and petroleum are produced on a commercial scale.

MR. JOHN P. BARRETT, the city electrician of Chicago, proposes to use the city electric-lighting plants for improving the water-supply. As every one knows, water for the city is drawn from Lake Michigan, and forced directly into the mains, under what is known as the Holly system, by pumps placed at various points, generally on the lake-front. As the city grows, and the network of pipes extends, these pumps have to force an increasing volume of water against an increasing friction. To a certain extent, the power of the pumps can be increased in proportion to the demand on them, but the limit of this increase is reached when the mains nearest to the pumps are no longer capable of resisting safely the pressure of the water which the pumps force into them. At several of the pumping-stations this limit has already been reached, but the supply is inadequate in the remoter portions of the territory dependent on these stations, and will be still more deficient in the territory still further away, which is being rapidly covered with buildings. In this emergency, Mr. Barrett suggests that, instead of laying new mains, and increasing the power of the main pumps, it might be possible to use electric-pumps, placed at various points, toward the circumference of the network of mains, as relays, arranging them in such a way that they would draw the water, under a comparatively feeble head, from the mains on one side, and force it out, under a much higher pressure, into the mains on the other side, thus reinforcing to any desired extent the head in the mains in the districts which now complain of an inadequate pressure. As the principal consumption of water is in the daytime, while lights are needed mostly at night, he thinks that the engines and dynamos at the lighting-stations could be utilized during the day for pumping, without detriment to their capacity for furnishing light at night. As the City of Chicago owns four lighting-stations, and can get power from several private corporations, it would be easy to make the experiment, and the City Engineering Department is working out the details of a scheme for trying it.

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A SERIES OF FIREPROOFING TESTS.



Culver House, Brighton, N. Y.

DURING the early spring of 1895, a number of test-houses were erected in the basement and first story of a new fireproof building in process of erection on Boylston Street, in the City of Boston, for the purpose of making a comparison of the value of different materials for fire resistance only.

The tests were made three months later, under the direction of Mr. F. E. Cabot, Superintendent of Boston Board of Underwriters, in the presence of Capt. John S. Damrell, Commissioner of Buildings for the City of Boston, and his chief Inspector, Mr. M. W. Fitzsimmons.

The tests were instituted by Mr. Willard T. Sears, for the purpose of obtaining accurate data in determining the value of several different systems of fire-resisting construction presented to him for adoption in buildings that he was designing for various uses, viz.: An appraiser's warehouse, 70′ x 150′, seven stories high, to be occupied by the United States Government. A warehouse 60′ x 200′, six stories high, for mercantile purposes. A store and office-building, 50′ x 125′, six stories high. An apartment-house, 106′ x 90′, eight stories high.

It will be observed that the character of these buildings admitted of a considerable variation in the strength of construction to be used, and the object of the investigation was not only to obtain the lightest construction suitable to meet the requirements for strength and stability, but also to determine fire-resisting qualities that would allow everything of a combustible nature in any room or portion of a building in which a fire might occur, to burn out without the fire extending to other portions of the building.

The result of these tests has demonstrated the fact that, where proper care is taken to fill all air-spaces and holes in the different stories, especially where the floors join walls and partitions, and where pipes and wires pass through them, a building is practically safe from fire extending beyond the room in which it was ignited, and, in an office-building, apartment-house and buildings of like character, if the fire were to be allowed to burn out the contents of the room without water being thrown upon the fire, less damage would probably result than if water were thrown upon the hot plastered concrete, which might crack and become loosened from the metal lathing, and cause damage in adjoining rooms.

One side of each of these houses was built against one of the party-walls of the building, which was given a coat of King's Windsor dry mortar, to prevent the fires from scaling the brickwork. The other three walls, floors and roof were constructed of the material to be tested.

For future reference, these test-houses were numbered 1, 2, 3, 4, 5, 6, 7. Numbers 1, 2, 3, 4 and 5 measured 4′ 6″ x 8′ 6″, and were 8′ high; these were located in the basement.

An opening 2′ x 3′ was left at one end of each to admit fuel, and at the opposite end a connection with each was made to 8″ x 12″ flues of the building to carry off the smoke.

The roofs of these houses were built between, and supported by the first-floor beams of the building, and were virtually floors.

The two houses erected on the first or ground-floor were numbered 6 and 7, and were each 4′ 6″ x 8′ 6″. They were 11′ high, and were built of wood.

As in the basement houses, each was provided with an opening at one end, 2′ x 3′, for the admission of fuel, and was connected by 8″ x 12″ smoke-flues of the building.

These houses differed in their construction as follows:

No. 1.— Erected by the New Jersey Wire Cloth Company, according to the Robeling system of construction. Steel studs, 2½″ x $\frac{3}{16}$″, placed 16″ on centres, were fastened securely to the basement floor and to the ceiling; these were covered on both sides with stiffened wire-lath of their manufacture, and the house was then plastered within and without with two coats of King's Windsor dry mortar.

The roof was constructed of stiffened wire-lath, sprung between the first-floor beams in the form of an arch, which was covered with a concrete of broken stone, sand and cement. This was levelled-off flush with the tops of the floor-beams, giving practically a concrete arch of the depth of the beams (12″) at the springing, and 4″ deep at the crown; wire-lath was also carried beneath the lower flanges of the floor-beams, and the whole ceiling below was plastered with two coats of King's Windsor dry mortar.

No. 2.— The walls of this house were built by the Eastern Expanded Metal Company: Strips of wood, 2″ x ½″, placed 16″ on centres with ordinary stove-pipe iron applied to the 2″ faces, secured at floor and ceiling (the office of the wood strips being to furnish a simple means of securing the metal lath, ordinary iron staples being used). They were then covered inside and outside with Expanded Metal Lathing, and plastered within and without with two coats of King's Windsor dry mortar.

The roof of this house was built by the New Jersey Steel and Iron Company, and is known as the "Metropolitan Floor." Cables of twisted galvanized iron wires were stretched between the roof-beams, and fastened to the top flanges by means of a hook of No. 12 copper wire. These cables passed under ¾″ round iron rods, placed between the beams midway of the span, which gave them a belly-truss form, and kept them taut while the plaster concrete was being applied.

Flat level forms of wood were placed beneath these cables (about 3″ below the top flanges). The lower portions of the webs and bottom flanges of the beams were covered with wire netting, so as to form ceiling-beams when finished.

Upon and around these forms, a composition of plaster-of-Paris and wood chips was poured, and levelled off 1″ above the top of the beams. The constructional iron was thus entirely covered with not less than 1″ of the composition. When it became thoroughly set, the wood forms were removed. The ceiling was left unplastered below.

No. 3.— This house was built throughout by the Eastern Expanded Metal Co. The walls were of steel channel bars, studs ⅜″ x ¾″ placed 12″ apart, secured at floor and ceiling, and covered with Expanded Metal Lathing, and were plastered within and without with two coats of King's Windsor dry mortar, embedding both studding and lath in a solid body of plaster.

The roof was built in two sections: The whole area was first covered with Expanded Metal sprung between the beams in the form of an arch. This was covered with a concrete of cinders, gravel and cement, levelled off 2″ above the floor-beams, giving a concrete arch about 5″ deep at the crown. One section was plastered directly upon the underside of the arch. In the other section, ⅜″ x ¾″ steel channel bars were secured to the lower flanges of the roof-beams and covered below with Expanded Metal. This was then plastered, giving a flat ceiling.

No. 4.— The walls of this house were built by the Clinton Wire Cloth Co.: Studding of ⅜″ x ¾″ steel bars, placed 16″ apart secured to the beam flanges, and covered on the outside with Clinton Wire Cloth of ½″ mesh. The two end walls were additionally covered on the inside with wire cloth, and the building was plastered throughout with two coats of King's Windsor dry mortar.

The roof of this house was what is known as the "Eureka Floor," constructed as follows:

Wood centres of 2″ plank were placed 2′ on centres between the roof-beams, resting upon the lower flanges.

The tops of these centres were level and flush with the tops of the beams; the underside was cut in the form of an arch leaving 3″ of wood at the crown. The underside edges of the wood centres were bevelled off to ¾″ thickness, and Clinton Wire Cloth stapled to them. A concrete of gravel, sand and cement was filled-in and levelled off flush with the tops of the floor-beams and centres.

These centres gave nailings for the wood floor above. The ceiling below was plastered with two coats of King's Windsor dry mortar.

No. 5.— was built by the David McIntosh Co., of hollow, porous terra-cotta blocks 3″ thick, laid-up in common mortar, and plastered on both sides with two coats of King's Windsor dry mortar.

The roof was built of 12″ hollow porous terra-cotta floor-blocks, plastered below and covered on top with 2″ concrete, in which were embedded 2″ x 4″ bevelled strips to form nailings for wood floors.

No. 6.— The floor was of wood joists 2″ x 12″ set 16″ on centres, upon which was placed, first a rough floor of ⅞″ matched pine floor boards, 6″ wide, then two thicknesses of building-paper, and last a finished maple floor ⅞″ thick.

These floor-joists were lathed and plastered on the underside to represent a ceiling of a lower room. Upon this floor were erected walls or partitions of 2″ x 4″ studs, placed 16″ on centres, lathed with wood laths and plastered in the usual way, King's Windsor dry mortar being used. The roof was constructed in the same manner as the floor.

No. 7.— A floor of 3″ pine plank splined together, was laid directly upon steel I-beams 5 feet apart; upon this was laid a double thickness of building paper, and then a ⅞″ finished floor of maple.

Upon this floor were erected walls or partitions of 3″ pine plank splined together and covered on both sides with stiffened wire-lath lapped 2″ at each joint. The roof was built of 3″ pine plank splined together and covered on the underside with stiffened wire-lath. The whole building was then plastered with two coats of King's Windsor dry mortar.

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On the day appointed for the testing, a careful examination of the houses was made before the fires were started.

No. 1, which had been plastered early in the spring, was found to be in bad condition, due, no doubt to the freezing of the plaster. Its representative objected to the fire-test being made, and it was therefore abandoned.

The walls of Nos. 2 and 3, which had stood directly beneath a light-shaft open to the weather, were found to be slightly damp, but otherwise all the houses were in good condition.

At 10 A. M. small fires were started in Nos. 2, 3, 4 and 5 for the purpose of starting draught. At 10.30 cord-wood was thrown upon all the fires, care being taken to distribute the fuel so that the flames should reach every part of the interior of the houses.

At 10.45 A. M. hot fires were burning in Nos, 3, 4 and 5 and by 11, in No. 2 also. The fires were kept at a great heat, and at a maximum intensity in each house for one hour, after which time fresh fuel was not added. No water was thrown upon the fires directly, or upon the houses.

Careful notes were taken of any change in the condition of the house during the firing, and after the fires had gone out a careful inspection was again made.

These notes were taken, and have been arranged in the form of a comparative table by Mr. H. W. Chamberlain, of Massachusetts Institute of Technology, as follows:

Test No.	Fire started.	Fire under good headway.	Action during test.	Condition at end of one hour.
2.	10.30 A. M.	11 A. M.	At 11.10 A. M. plaster dropped from brick party-wall.	Plaster on Expanded Metal intact. Brick party-wall scaled in a few places from action of fire.
3.	10.30 A. M.	10.45 A. M.	10.45 A. M. there was an explosion. It threw the plaster off Expanded Metal wall on inside near lower front corner, and from the brick party-wall. At 11 A. M. there was a second explosion, which threw the plaster from inside and outside of Expanded Metal wall near lower front corner, leaving a hole about 2″ in diameter. A third explosion threw plaster from inside of Expanded Metal wall near the bottom.	Ceiling intact. Except on brick party-wall the plaster that was thrown off was the second coat. The metal was exposed where the explosion made a hole in the metal wall. The bricks scaled off the party-wall after the mortar came off.
4.	10.30 A. M.	10.45 A. M.	10.50 A. M. plaster dropped from brick party-wall.	Ceiling intact. Bricks on party-wall badly scaled by action of fire.
5.	10.30 A. M.	10.40 A. M.	10.50 A. M. explosion. Plaster dropped from brick party-wall, and part of the ceiling.	Brick party-wall badly scaled, tile ceiling sustained no injury. Plaster on side wall cracked, but still clung to the wall.

During the fire, the outside of the buildings in no case became too hot to bear the hand. The sides and ends of No. 2 and the side of No. 3 were hottest, as would be expected from the construction.

The top flanges of the floor-beams above houses Nos. 2 and 5 were cool all through the test. Those above No. 4 were warm, while those above No. 3 were fairly hot. On breaking open the sides of No. 2, it was found that the wood strips in the studding had been charred by the action of the fire to a depth varying from $\frac{1}{16}$″ to $\frac{1}{4}$″ deep, according to position in the walls. The tops of some of the studs were charred more than half way through. The floor centres of No. 4, on the other hand, were scarcely charred at all; in no case more than $\frac{1}{16}$″ deep, and in nearly all cases the wood had not been discolored.

The difference in expansion between the ironwork and the plaster seems to have been inappreciable, as in all cases the plaster adhered closely to the metal.

The explosions referred to may have been occasioned by gases formed by the great heat, or by dampness in the materials.

The action of the fire on test-house No. 6 was watched with considerable interest; it had been decided to let the fire burn here until it made its appearance on the outside. The fire was started at 11.45 A. M. The plaster dropped from the brick party-wall at 12 M. and from the laths on the rear end near the bottom at 12.05. The laths and studs were well on fire in the rear at 12.10 P. M., and at 12.20 plaster dropped from the ceiling and the wooden side walls. At 12.25 the whole building was thoroughly on fire within; the outside plastering was still intact, although too hot to bear the hand. Later, a crack began to open along the angle at the junction of the end and side walls, which increased steadily until 12.50 P. M., (an hour and five minutes from the time of starting the fire), when flames made their appearance through the crack, and water was immediately applied and the fire extinguished.

On breaking away the exterior plaster on the rear wall of the house, it was found that the laths behind it were all burned away to a height of six feet above the floor.

The studs were also badly burned. The sidewalks were in a similar condition.

The brick party-wall was badly scaled over its entire area.

The top floor had been burned away in front near the firing-door, but the under floor was still sound; half way back, the top floor had not been burned through.

In No. 7 the fire was started at 12.27 P. M., and was well under way by 12.50. The plaster dropped from the brick party-wall at 12.55, but the plaster on the metal lathing was intact, but red hot.

At 1.25 P. M., two cracks appeared on the exterior of side wall, where the metal lath was lapped, but neither flames nor smoke had found its way through the house at 2.37 (two hours and ten minutes from the time of starting the fire). It was not thought expedient to carry the test farther, and several attempts were made to extinguish the fire in the walls by throwing water into the houses from hydrant, but owing to no attempt being made to remove the plaster from the party-walls and roof (which remained intact, except the cracks referred to), the planks continued to smoulder, protected by the plaster, for forty-eight hours longer, in spite of frequent applications of water upon the plaster.

When the building was torn down, it was found that the planks forming the sides were more than half consumed. The plaster, aside from the drenching it had received, was in good condition.

The top floor had been burned away about half-way back from the firing-door, the under plank floor remaining still sound.

The brick party-wall was badly scaled over its entire area, showing the intensity of the heat.

A question in regard to the comparative weights of the concrete materials used in the construction of the different roofs having been raised, it was decided to weigh a section of each.

The *débris* from the fires was removed from the houses, the roofs broken down, care being taken to preserve all the material that had entered into their construction, and it was then weighed on platform scales. The data thus gathered are tabulated below:

Test No.	Construction.	Area of section.	Total weight.	Weight per sq. ft.
1.	Robeling System.	18 sq. ft.	1,295 lbs.	72 lbs.
2.	Metropolitan system.	18 "	427 "	23.7 "
3.	Expanded Metal Co.'s System.	22.5 "	1,697 "	75.4 "
3 *a*.	Same as No. 3 with additional flat ceiling.	22.5 "	1,814 "	80.6 "
4.	Eureka System.	20.25 "	1,648 "	81.3 "
5.	Porous hollow tile arch blocks covered with concrete 2″ thick.	20.25 "	1,781 "	87.95 "

In considering this table it should be noted that all of the floors were plastered on the underside, and were concreted on top, ready to receive the wood floors. The plastering on No. 5 fell during the fire-test and was removed with the *débris*, and, consequently, not weighed with the other material; the weight of the 12″ stud floor-beams is not included in the weight given above.

Completeness is not claimed for any of the above tests; it was thought, however, that the tests offered many valuable suggestions, and threw many new lights on the subject of fireproof construction.

SPANNING SPACES.

If we were asked what was the greatest and most momentous building problem that has been the motive of every great architectural style in the past, we should certainly answer it was the problem of spanning openings and covering spaces. Both these requirements, no doubt, arose contemporaneously, and both exercised a very marked influence on architecture, for it was the development of the former which gave the varieties of facial expression to buildings, and that of the latter which exercised so potent an effect on the plans and contour of structures of all ages. From the early trabeated or Greek expression to the latest invention or fancy of the Renaissance architect we have an inexhaustible variety of types, each one of which has swayed the destinies of a style. No professional reader will want examples. They are to be seen in every national style in which there has been a genuine growth, and in every historic building. No less has the mode of covering areas exercised an influence on style. The change from the flat to the arched roof is of interest. From the square Hall of Xerxes, which, according to Fergusson, covered 105,000 sq. ft., was larger than any Greek temple and was covered with a flat, wooden roof, supported by numerous pillars, in seven bays, to the Pelasgian tomb house at Mycenæ, which was circular, and 48 ft. in diameter, and was covered by an equilateral pointed vault, with horizontal layers of stones, this is a decided step in advance. Not that the real principle of the arch was unknown, for there are, upon the authority of Layard, Hoskins and others, chambers round the Egyptian pyramids roofed with stone and brick arches; but these constructions were of a limited kind, and the arch seems to have been confined to small tombs, or chambers or vaulted drains. The Pelasgian or Etrurian treasuries or tombs had scarcely

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any direct influence on style, for they were covered by earth, and not visible, and it has been shown that the horizontal-course system of arch construction was not confined to the Pelasgic races, but was adopted in India and Asia Minor. They, at least, prove that the principle of arch construction was known long before it was applied boldly as an architectural feature. The horizontal arch was quite safe so long as it was equally weighted externally by earth or by masonry; but it was reserved for the radiating principle of construction to accomplish the great feats which developed into typical forms of architecture. Step by step we see the progress made. First, the dome was made an external feature. From the round temple at Spalatro, or the Pantheon rotunda, whatever its age, to the beautiful temple of Minerva Medica at Rome, with its dome of 80 ft. diameter resting upon a polygon made up of circular niches or alcoves, there is a decided advance. The pendentive system is adopted at the angles, the arch is built on the radiating principle with ribs of tiles between, which is filled by lighter material, and the plan of concentrating the material of the arch at certain points supported by external buttresses is recognized. Circular or polygonal structures were thus the earliest development of the arch, as we find in many of the Roman temples and in the Christian baptisteries of a later age. Next we have the more complex circular church of St. Vitale, Ravenna, an octagonal structure of 110 ft. diameter, its inner dome of 50 ft. forming the clerestory above the sloping roofs of the octagon aisles and galleries. The builders here attempted to vault a space with the least thrust by using earthern pots instead of stone masonry, and this vault is brought down to the octagon, the angles being cut off by squinches. Here the vault is lightened and covered externally by a low timber-framed roof, being one of the first examples of the later vaulted construction. The vault was internal. It is not so skilful an example of vault construction as its Roman prototype, which visibly exposed the vault. There are no ribs to concentrate the thrust, no buttresses; but it shows that the problem was understood, and how economy of material and weight could be insured. The church of San Lorenzo, Milan, is a farther step; the dome is octagonal, 70 ft. in diameter, and externally the building is a square, with segmental recesses in its sides. From these and other Romanesque circular churches the development of the Byzantine style was easy. The problem was to obtain the largest area possible under the dome, and this was solved by the use of pendentives. To rest the dome on eight piers or an octagon had been accomplished, and it was next essayed to cover a square by a dome, or on four piers instead of eight. At Sta. Sophia this was done. A hemisphere, whose radius was half the diagonal of the square, the sides of which vertically cut the sphere, was the geometrical solution. The pendentives formed the four corners of the square, and descended to the springing of the vault. By this simple method a square space was roofed by a circular dome, the diameter of which was equal to the diagonal of the square, and great constructional advantages were secured at the same time, as the weight of the dome and its thrust were brought down by the four pendentives to the supporting piers. In the great church of Sta. Sophia, we observe a perfect development of the pendentive dome; the building, to its outer walls, which are rectangular, covers an area of about 70,000 sq. ft., equal to many of our cathedrals. To give length to the domical area, two semi-domes are added, east and west, of the same diameter, equal to the centre dome, and these latter in turn are extended by smaller semi-domes. By this assemblage of domes considerable apparent scale is given to the building. One large dome equal to the whole area covered by the central and semi-domes would have dwarfed everything by its great size and height. Thus it was reserved for the Byzantines to lift the dome bodily above the walls, and make it a dominating feature in the architecture. St. Mark's, Venice, is an important instance of this fact. The plan, a Greek cross, has five domes, one central over the crossing, and the others over each arm, and the whole area covered is 46,000 ft. These domes are semicircular, and have considerably stilted external domes, which emphasize them. Altogether, St. Mark's is an excellent example of the domination of arched forms, and its front of five deeply recessed semicircular portals, and its arched windows above, show to what an extent the arch was carried as an element in external architecture. The well-known church of St. Front, Perigueux, a Greek cross with five domes, resembling St. Mark's, illustrates the same treatment, but the cupolas are pointed.

As Fergusson has shown, the pendentive dome system was thoroughly understood by the Indian builders, who managed to throw the weight of the dome internally, thus counteracting the thrust, and the Jaina architects adopted the Pelasgic or overlapping form of arch, and developed this principle in many ingenious ways. The Hindoos rejected the arch constructed of radiating stones, and in every case, constructive as well as decorative, employed the horizontal form. Gateways had a succession of brackets, one overlapping the other, and the bracket arch was common. In covering their spaces, the Hindoos first cut off the angles of the square by triangular stones; they next carried this a step farther for larger areas by using three tiers or courses of horizontal stones, the first tier cutting off the corners, the next similarly cutting off the corners of the diagonal square, and the last covering the opening. The area is thus quadrupled, as Fergusson shows. Again, the corner supporting pillars of the square are increased in number to twelve by placing pillars under the intersection of the diagonal with the outer square, and these are sometimes increased by adding external squares on each face of the octagon. By this means a large area was covered by a series of squares with domes making a lozenge-shaped space, and giving a pleasing and varied plan. Fergusson points to St. Stephen's, Walbrook, as a building where this method has been carried out on Classical lines. The dome is carried on eight columns, with four more at the outer angles of the square, and with outer compartments. The Indian plan of roofing has not been followed by Western architects: that it has many beauties and possible applications to modern wants cannot be doubted.

We have alluded to the dome first; but contemporary with it is the Western method of roofing founded on Basilican models, and which culminated in our great mediæval churches, or as we see it in the cylindrical and pointed vaults of the South of France. The nave and side aisles are covered with round or pointed tunnel-vaults, though in the same province the pointed dome-roofed style appears, as at St. Front and at Angoulême. The barrel-vaulted roof was not visible externally — a characteristic which generally prevailed in the vaulted buildings of the Middle Ages. It formed an internal ceiling covered by an outer roof: it had to be resisted by thick walls and buttresses at intervals. When we consider that all arch and vault building arose from the necessity of using small materials in the covering of space, it was economical; but when an outer timber covering became really the roof, its function became more decorative. The introduction of the cross-vault was, however, an important advance, as it enabled the weight and thrust of the vault to be concentrated at four points, and therefore a larger space could be covered. It became in this way a rival to the cupola, and assumed an external expression by the use of buttresses and pinnacles at the points where the diagonal ribs meet. Another architectural feature that seemed to grow with the cross-vault was the gable. But it is chiefly as a method of spanning space that we now refer to the intersecting vault. The triple-vaulted aisles of our great cathedrals, and the greater widths spanned by five vaults on the Continent, show how this system adapted itself for the covering of large areas.

The lessons we draw from these older methods of covering space are twofold — constructional and architectural. With our improved facilities and materials we might employ domical construction more than we do. With the exception of the late Mr. Herbert Gribble's concrete cupolas and vault over the church of the Oratory, Brompton, and the introduction of concrete vaults by Mr. W. Emerson in a large Indian building, few instances are within our recollection. The advantage of being able to construct a dome of a thin crust of Portland-cement concrete *in situ*, without any thrust, light and strong, does not appear to have encouraged architects. Concrete and iron have been used in flat roofs and floors for many years; but architects seem unwilling, or are too timid, to employ the same materials on a large scale in roofing. Why the domical system of covering space has so little attraction for modern architects, it is difficult to say. We are not subject to earthquakes like many Eastern countries, where domes have always been used, of the horizontal kind, at least; therefore we cannot plead as an excuse its want of stability. The arched forms of spanning space we have spoken of were often the precursors of plan and style — at least, they suggested them; — but it is not so now. Covering space has now become a matter of cheapness and convenience, and the modern invention of the truss and iron girder, the third great system of spanning a void — the other two being the beam and the arch — has superseded these older and more constructional forms. The solid beam or lintel was limited to moderate spans, as it was simply the natural cohesion or tensile strength of stone or marble which had to be depended on; but when the truss was invented, or the "tie," as we see in the ordinary king-post roof, there was no limit to the covering power. It far excelled the arch or vault, which could only safely span 30 or 40 ft. The iron girder or truss in its many forms has made its way in modern architecture and any shaped plan or space can be spanned by it. It has no influence, like the former methods, on the architecture. This is why our modern "styles" are so characterless. Why insert an arch over a window, if an iron or concrete lintel will do as well? is the reasoning of the modern architect. The arch once influenced style, as we see in the noble Florentine example of Renaissance, the Riccardi Palace, in the Pitti, and in St. Mark's, Venice. Now, it is only introduced as an ornamental form to give variety, in the same manner that we see a domical ceiling of plaster cradled out from a tie-beam roof, a poor travesty of the constructed vault, or a dome serving an inner covering, like those of St. Vitale or St. Mark's, or St. Paul's. Why not again make the vault an independent structure and construct it of concrete? The Indian method of overlapping stones we have noticed suggests the possibility of constructing vaults without thrust, and of giving variety to interiors. The modern flat ceiling, with its girders and pillars, has nothing to suggest plan; any shaped room can be covered by it, it does not occupy height, and hence it has superseded other more architectural methods of covering span. The subject is one which deserves more attention from architects. Constructive vault-building appears to be a thing of the past. It is now imitational except for a few churches and important buildings, or is superseded by flat roofs, in which cheapness is the main consideration. Timber trusses, boarded or ceiled, are used almost entirely in our churches, because the walls need not be built so thick, and wider spans can be covered, requirements which appeal to the profession generally. There are, however, yet a few of our leading church architects who have

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revived the vault of masonry, and have, to their credit, done a little to preserve the traditions of vault-building, and to keep that scientific branch of masonry from extinction. — *Building News.*

NEW ORLEANS.



BUILDING ACTIVITY. — DRAINAGE. — A NEW RAILROAD. — THE LIBRARIES.

BUILDING was never more active in the City of New Orleans than it is to-day, and the activity seems to include nearly every class of building. Residences are going up, in great numbers, in all parts of the city, but more particularly in the newer portions on the outskirts. Many-storied mercantile and office-buildings are being erected down town. The new St. Charles Hotel is approaching completion upon the site of the old. A fine church edifice is in process of building on Canal Street and the new Pickwick Club-house is about to be begun.

At a public meeting recently held here, a speaker stated that the three subjects engaging the attention of public-spirited citizens in New Orleans, at the present time, were drainage, pavements and free wharves. The subject of drainage has risen to an important position, in the popular mind, spasmodically for many years, but without any very satisfactory results thus far. Many schemes have been tried and abandoned. Certain "drainage-machines" are landmarks in the swamps and canebrakes in the vicinity of the city, and these appear to be preserved as historic relics of abandoned drainage systems. The city is at present suffering another spasm of interest in the subject. Certain prominent streets, which had but recently resumed their accustomed condition, after having been torn up for the laying of electric-car tracks, are being again dug up (revealing a depth of filth and depravity over which it is astonishing that any people should consent to live), with the ultimate purpose of establishing an underground sewer system. It is understood that the drainage-machines will be called into use, and that the system is to find an outlet in Lake Borgne.

It has long been a matter of complaint that the port charges in this city are largely in excess of those of competing ports, to the great disadvantage of the commerce of the Crescent City. But while the public press is agitating the subject of free wharves, and while the various business exchanges are discussing it, a new railroad is being constructed which will contribute a powerful argument in favor of emancipating the wharves, and will also stimulate the growth of the city in a new direction, that is, towards the mouth of the river. This railroad is known as the New Orleans & Western. It is to cross the Mississippi River from the west at Avondale, beyond Southport; and to form a belt-line back of the city, between the river and Lake Pontchartrain; crossing the Illinois Central, the North Eastern and the Louisville & Nashville roads; and have its terminus at Battle Ground plantation — the historic field of General Jackson's military exploits — considerably below the city, in St. Bernard's parish. At this terminal point, the railroad has secured a mile of river-front and has begun the erection of wharves, elevators, compresses and storage-warehouses. Cotton, sugar, rice and, indeed, all the products of the Mississippi Valley, can be brought to these wharves, by the railroads connecting with this belt-line, and Battle Ground will be the centre of shipping interests in the near future.

The New Orleans people are not a book-reading people, so say the book-sellers and librarians. Yet the city has five libraries. The Howard Library is the best known, probably because of its central location and its exquisite building, designed by Richardson and executed by his successors. The State has a law library in the Law Department of Tulane University. The University has a library which it has removed to its new buildings near Audubon Park. It was formerly connected with the Fisk Library, which is now left somewhat lonesome in one of the deserted Tulane buildings. The city has a library in the City-hall, its chief treasure, apparently, being a superb copy of Napoleon III's "*History of Julius Cæsar*," presented by the author, and carefully preserved under a glass globe. The City Library asserts the possession of eighteen thousand volumes, the Fisk Library fifteen thousand. It has been determined to consolidate these two libraries, and the city engineer has prepared plans for the conversion of the second floor of the City Court Building (on Camp Street, fronting on Lafayette Square, nearly opposite the City-hall) into a library and reading-room. The building has not the faintest suggestion of a home of literature in its exterior, and it is not claimed that its interior will embody the most modern ideas of library architecture. But the building is spacious and the arrangement will be economic, and both collections of books will be made more accessible to such as choose to avail themselves of them.

THE EMPIRE OF INDIA EXHIBITION, LONDON.



Arms of the First East India Company, from the Church of St. Matthias, Poplar.

ARCHITECTURALLY, the buildings erected for this show are very remarkable, especially in the treatment of stucco ornament, which is copied from genuine Indian examples. Nor are the painted buildings and landscapes to be despised, and taken as a whole, the effect of these against a clear blue sky (and we have had several this summer) is very striking. There is a fascination in white buildings in the sunlight — who does not remember the Portuguese Palace at the last Paris Exhibition! If the substances with which they are constructed be only lath, plaster and white linen, the effect is none the less beautiful. We cannot have them in marble, so let us be content. Probably few visitors are discontented with the white curry-house and other buildings surrounding the lake in the Queen's Court; and when lighted up in the evening, it is really a charming picture, with the white and red turbaned Indians and the electric barges moving about. The mosque is an especially beautiful building, purporting to be of red sandstone, with a fine entrance and two minarets with domed tops.

But apart from the Exhibition as a show, it is well worth a visit, and a long one, to pore over the relics of the "old-world" Honorable East India Company. How few of us know the history of this! We have heard from childhood of East India-men — great three-masted ships, and of the Black Hole of Calcutta, and of Tipu Sultan, and of Lord Clive, and a hundred other things. But as to knowing anything about the constitution of the Company, alas, how ignorant we are! That dear, kindly, much-tried Charles Lamb was a clerk in the India House, is about the sum total of our knowledge.

Well, here is the great Clive's tent, and here also, are the shoes, the gloves, the finely damascened armor, a richly-jewelled jade dagger, and other relics of Tipu Sultan. A very interesting link with the past is the book of minutes of the meetings held by the Company from 1599–1603; and the first letter-book of the Company, extending from 1600–1619. The first of these books was reproduced in 1886 at the expense of the late Mr. Henry Stevens, of Vermont, U. S. A. A fine portrait lent by the Skinner's Company representing Sir Thomas Smythe, the first governor of the East India Company, hangs amongst other worthies of very inferior artistic value. Sir Thomas was also a leading member of the Virginia and Summers Islands Companies, and a promoter of Arctic navigation; besides being a member of the embassy sent by James I to Russia, in 1604. A large number of charters are shown, the first being an illuminated copy on vellum of the charter of James I, dated 1609, for engrossing which the Company made arrangements in January, 1610: it is a fine specimen of the calligraphy of the time. The original letter of James to the Shah of Persia in 1622 is no less interesting. Near this is a warrant of Cromwell's, for the repayment to the Company of its loan of £50,000 to the State.

A very curious relic of former times is a series of tally-sticks for the yearly payment of £10 for the quit-rent of the Island of Bombay which had fallen to the British Crown as part of the dowry of Charles II's Portuguese wife. These sticks were notched to represent the number of pounds, shillings and pence of a debt, before writing and arithmetical quantities were part of the general education of the people. Quoting from the account of these tally-sticks in the catalogue: "A narrow shaft of wood (generally box, willow, hazel, or other hard variety) was taken, and notches carefully cut on one side, or, if necessary, on two opposite sides, each ordinary notch representing one pound; shillings and pence could also be symbolized, while large notches stood for hundreds and thousands of pounds. The tally was next split down the middle for nearly its whole length, where a side cut released the smaller portion, leaving the rest of the tally provided with what may be described as a handle. The larger half, variously named the 'stalk' or 'counter-foil,' was delivered to the person paying in the money represented, for which it served as a formal receipt; the other part, known as the 'leaf' or 'foil,' was retained in official custody. In cases of doubt or dispute, or of allegation that the number of notches had been surreptitiously increased, the two pieces were fitted together, and their agreement (whence the expressive verb 'to tally') effectually settled the question." Another tally-stick represents a sum of money presented by the Company to Charles II of blessed memory. Oddly enough, and proving the conservatism of the British Government, this mode of reckoning is said to have been in force at the Exchequer as late as 1824.

Three pictures should be mentioned: that of Robert, Lord Clive, attributed to Dance; Lord Pigot, by Hogarth, and last, not least, a fine portrait, by the late Frank Holl, of Sir Henry Rawlinson, the last survivor of the Directors of the Company, who were appointed to the Council of India upon its formation in 1858.

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Interesting relics of the past are the drawings of the old Poplar Chapel and the original East India House. Here it was that auctions of Indian and Chinese goods were held from time to time in the days when there was no Mr. Liberty to tempt our love of the beautiful. Poplar Chapel was started in 1646 for the use of seamen and others who worked in the district. The site was given by the East India Company, close to the almshouses they had erected fifteen years previously, as a hospital for the relief of such as had been or should be maimed or grow old in the Company's service. Later on they gave building materials and a liberal grant of money. The edifice was finished in 1654, repaired in 1721 and again in 1776, and lately has been encased in stone and dignified by the name of St. Matthias's Church. In 1806 the inhabitants of the almshouses were pensioned off, and the buildings pulled down, after the manner of Emanuel Hospital and other old foundations for the aged poor, which get into the hands of the Ecclesiastical Commissioners. The only part of the church which recalls the old Chapel is the moulding from the ceiling which supports the arms of the Company, the latter having probably been placed in position at the building of the chapel. They were assigned to the Company in 1601.

Other relics of the old time are some uniforms of the Madras artillery, with helmets almost identical in form with those worn by the French cuirassiers, and having the leopard-skin covering of the Empire period and the long red and black horsetail now in use. Tipu Sultan's walking-stick is a curiosity in being made from the upper jaw-bone of a sword-fish: it is gold mounted and was taken from the palace at the storming of Seringapatam. Attached to the portrait of Warren Hastings, by Sir T. Lawrence, there is a story that the painter gave orders that it was never to be touched. Consequently, we see it now as time and damp have made, or marred, it — cockled, mildewed and with one eye gone. It is in pastel, and, doubtless, Sir Thomas meant that it should not be wiped, or its surface touched, which has frequently been the fate of pastels; but its owners interpreted the order otherwise, and have so religiously carried it out, that it is questionable whether it is not too late to save the drawing. What excellent virtues are obedience and zeal! In the dress of the attendants — blue robes, trimmed with red ball-fringe, and cocked hats — we see the costume of the beadles of the old India House, now as defunct as the Company itself.

Some drawings of Brahmins in the act of prayer are exceedingly interesting, as they show the manifold actions of the hands during the Sundujah, or daily prayers. Naturally, the views of Madras and Bombay in 1799, original drawings of temples, mountain-passes and the like, are no less interesting when we compare them with photographs of the cities at the present time. What changes! and not always, as regards beauty, are the changes for the better. But, on the other hand, as regards peacefulness and contentment, the native races are probably better off now than at any time since the Portuguese, in the fifteenth century, called themselves "Lords of the Conquest, the Navigation and Commerce of the Eastern Seas." At any rate, those that are now here in London have an opportunity of seeing their rulers under the best possible conditions; and, doubtless, their estimate of the visitors to the Exhibition will be somewhat different from that formed of the ordinary Anglo-Indian, civil or military. We have no feelings here in England, Scotland or Ireland against the "colored" races; consequently, the native, from the Shahzada down to the driver of the delightful little Poonah bullocks, no larger than a dog, are made much of and fêted to their hearts' content.

S. BEALE.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

CENTRAL CONGREGATIONAL CHURCH, NEWTONVILLE, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

HOUSE OF MRS. JOSEPHINE SCHMID, FIFTH AVE. AND 62D ST., NEW YORK, N. Y. MR. R. H. HUNT, ARCHITECT, NEW YORK, N. Y.

HOUSE AT BUFFALO, N. Y. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR A. D. CLAFLIN, ESQ., NEWTON CENTRE, MASS. MR. S. J. BROWN, ARCHITECT, BOSTON, MASS.

PROPOSED HIGH SCHOOL, MIDDLETOWN, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

STAIRCASE-HALL IN PROPOSED HOUSE FOR W. W. SMITH, ESQ., HARTFORD, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

HOUSE AND STABLE FOR E. W. RICE, ESQ., SWAMPSCOTT, MASS. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

INTERIOR OF THE CENTRAL CONGREGATIONAL CHURCH, NEWTONVILLE, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

TOWER OF THE SAME CHURCH.

[Gelatine Print.]

MESSRS. THOS. COOK & SON'S COMMEMORATIVE BUILDING, LEICESTER, ENG. MESSRS. GODDARD, PAGET & GODDARD, ARCHITECTS.

TO meet the requirements of the increasing business of Thos. Cook & Son, and the Midland Railway Company, at Leicester, Mr. John M. Cook, the head of the firm of Thos. Cook & Son, resolved to erect premises to meet present needs, and to form, in the town of its birth, a monumental record of the origin and growth of the excursion system of the globe. The façade, in the style of Renaissance, is built entirely in buff terra-cotta and glazed faïence. On the ground-floor, the left-hand side of the premises is to be used as the excursion, tourist and shipping office, and is furnished in teak from designs by the architects, carried out by Messrs. Perkins, Long & Tyler. The shop on the right-hand side will be occupied by Messrs. Clarke & Hodgson, printers and booksellers, whose predecessors have carried on business on the same site for a century. This building will contain the newly-established Church House, and also accommodate the Leicester Medical Society and the Leicester and Leicestershire Society of Architects. Here the professional libraries of these learned bodies will be placed, and their meetings will be held on the site rendered familiar by long usage. The terra-cotta and faïence used externally have been prepared at the Burmantofts Works, Leeds, where the detail designs of the architects have been carried out with great accuracy and much artistic spirit. The façade is divided by cornices into four stories. The teak joinery on the ground-floor is enclosed by richly decorated pilasters, adorned with figures emblematical of Europe, Asia, Africa and America. This is surmounted by a frieze and cornice, and all up to this level is constructed in glazed faïence of rich and varied colors. On panels are recorded the names of some of the chief towns in all parts of the world in which Messrs. Cook & Son have established agencies. In the centre is a panel bearing the following inscription: — "Erected A. D. 1894, by John M. Cook, to commemorate the origin of the Excursion system of the world by Thomas Cook's special train from Leicester to Loughborough, July 5, 1841." The floor above this is lighted by four recessed and elliptic-arched windows balustraded on front.

DINING-ROOM, GREAT CUMBERLAND PLACE, LONDON, ENG.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints. and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

WOODEN PAVEMENTS. — Considerable difference of opinion being found to exist among experts as to the best kind of wood for use in street-paving, the Paris municipality has undertaken an experiment which will be watched with interest. The Faubourg Montmartre, one of the great arteries of the French capital, along which particularly heavy traffic passes all day long, is being repaired with no fewer than six different kinds of wood. These are pitch-pine, pine from the great swampy district in the south of France called the Landes, the inhabitants of which have to walk about on high stilts, teak, red karri, box and a particularly hard wood from Borneo. Each of these materials has particular qualities of its own, such as impenetrability, non-slipping surface and so forth. From time to time a committee of experts will visit the place, and draw up a report as to the substance which best stands the rough wear and tear. — *London Daily News.*

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Windows and Rooms. — It seems a self-evident proposition, yet one that is continually disregarded, says Aston Webb, that the size of the windows must be regulated by the size of the rooms that they are intended to light, yet nothing is more common than this example, where three windows all of the same size, "to preserve the uniformity of the elevation," as the speculative builder says, light three rooms of totally different sizes, the result being that one bedroom is fairly lighted, the other is very dark, while the dressing-room is so light that you hardly dare dress in it without the blind being drawn down, as you seem to be quite out in the open air. It is extremely difficult to lay down any law giving exact rules as to the proportion of lighting-space necessary for a given room — much depends, for instance, on the position of the light. In the well-known example of the Pantheon at Rome the building is amply lighted by a small circular opening in the roof. The cubic contents of this building are given at 1,934,460 cubic feet, and the area of the circular opening only 572 ft., or about one-third the amount required had the lighting been from the side. The rule said to have been adopted by Sir William Chambers is to add the depth and height of the room together, and an eighth of the result will give the width of window. Gwilt gives, as a general rule, 1 ft. super. of light in a vertical wall to every 100 cubic feet in the room. Robert Morris says that the superficial area of the window should equal the square root of the cubical contents of the room. This, however, though no doubt approximately true, must evidently be open to large variations according to the width of the street, and especially according to the aspect and the climate, and the exact size of certain windows to suit certain shaped rooms can only be learned by observation and experience. The matter is one of the greatest importance, and cannot be too carefully considered. It should also be borne in mind that certain rooms will require more lighting than others; a drawing-room more than a dining-room, a dressing-room more than a bedroom, and so on. And if this is carefully attended to (and, of course, taste and discrimination used), the elevation will be at least an honest and truthful one, and you will not find the principal windows on the ground-floor lighting, as is often the case, a cloak-room or a water-closet. — *Illustrated Carpenter and Builder.*

Bagatelle. — An American syndicate is reported to have concluded the purchase of Bagatelle for the purpose of erecting a gigantic caravansary on the site of the lovely château constructed within the brief space of ninety days by the Comte d'Artois, afterward King Charles X, for the purpose of winning a wager from his sister-in-law, Queen Marie Antoinette. This château, overlooking the race-course of Longchamps, is a perfect bijou, and constitutes one of the most picturesque features of the Bois. Its disappearance would be little less than a crime, and it is not astonishing that the authorities should have been invoked to prevent the execution of this project. It is unlikely, however, that their protests will be of any avail, as the château and park of Bagatelle are the private property of the widowed Lady Wallace, who has a perfect right to do therewith as she likes, and who, in spite of being a French woman by birth, infinitely prefers London to Paris. Her husband, the late Sir Richard Wallace, was a brother of the fourth Marquis of Hertford, and merely refrained from using the name of Lord Richard Seymour, to which he was entitled, with a view of avoiding any ill-natured comment about the behavior of his mother, who had given birth to him while detained in Paris as an English hostage during the Napoleonic wars, and to whom, like Lord Hertford, he was passionately attached. When Lord Hertford died in Paris, in 1870, he left the whole of his vast fortune, including his priceless art collections and the château and estate of Bagatelle, to Richard Wallace as "a token of gratitude not alone for the loyalty which he has ever manifested toward me, but more particularly for his loving care and devotion to our mother." A couple of years later Richard Wallace was created a baronet by Queen Victoria, partly as a recognition of his munificent philanthropy, and partly, too, if the truth were known, as a token of her royal appreciation of his chivalrous regard for the fair name of his beautiful mother. — *N. Y. Tribune.*

Of Interest to Art-collectors. — The Court of Rheims has just delivered judgment in a case of considerable interest to art collectors having dealings in France. The particulars of the case are as follows: Toward the end of 1893, M. Alvin Beaumont, a well-known painter and expert of Rheims, discovered a rather dirty old painting on copper in the shop of Madame Lapersonne, an art dealer, who called it a "religious painting." Having offered two Louis XV armchairs and a casket of the period of Francis I in exchange for it, the bargain was accepted and carried out. On removing the coat of dust and dirt on the painting, in the presence of Madame Lapersonne, M. Beaumont was not a little astonished, and the dealer disappointed, at the discovery that the painting was a genuine and remarkable "Visitation," by Rubens. Naturally, M. Beaumont refused to cancel the transaction, and the dealer brought an action against him. At the trial, counsel for M. Beaumont claimed that the case was one of treasure-trove, but the court held that, Madame Lapersonne having sold the picture as a "religious" subject, without specifying the name of the painter, the contingencies were equal on both sides. Had M. Beaumont, for instance, discovered his bargain to be mere rubbish after cleaning the painting, he would not, on that account, have been justified in claiming the cancelling of the transaction. The plaintiff's suit was, therefore, dismissed. — *Paris Correspondence London Standard.*

Density of Mahogany. — There is a remarkable difference in the density of mahogany as it comes to the cabinet-maker. A square foot of Cuban mahogany one inch thick weighs, on the average, six pounds; a like piece of San Domingo mahogany weighs four pounds, and a like piece of Mexican mahogany weighs two and one-half pounds. The difference in weight between old pieces of San Domingo mahogany taken from the wreck of antique furniture and a piece of seasoned new San Domingo mahogany is much less than might be expected. — *Chicago Inter-Ocean.*

Wine as a Fire-extinguisher. — At a large fire in San Francisco last June, when the water-supply gave out, the employés of the Lachman winery attached a long two-inch hose to an 18,000-gallon tank of claret wine that was perched upon a shed outside of the winery, and over an acre of lumber and dry roofs was drenched with wine. — *Exchange.*

The English Trade-unions. — The seventh annual report by the chief labor correspondent to the Board of Trade on the subject of trade-unions has been issued. The returns are for 1893, and it is noted that the early unwillingness of some of the unions to supply information as to their operation has now entirely disappeared. The number of unions from which accounts have been received was 687; the number of members at the end of the year was 1,270,789 (for 677 unions only). The year's income amounted to £1,996,971, and the expenditure to £2,246,515, reducing the funds in hand with which the year was begun from £1,902,397 to £1,653,068. 1893 was a bad year for these organizations, due chiefly to bad trade and a large number of trade disputes, chief among which was the prolonged dispute in the coal trade. — *S. James's Gazette.*

Master or Servant? — A Newcastle bricklayer, who on the death of a relative had come into a fortune of a few hundred pounds, decided to set up as a master-builder; and, as a commencement, entered into a contract to erect a small villa The building was started, but our friend soon found that an employer's life is not one of unalloyed bliss. An old friend chanced to pass the house one morning, and was astonished to find his mate of other days wielding the trowel once more, and superintending him and the other workmen was a strange foreman. The following conversation ensued:

"Why, Jack, lad! Hoo's this? Aa thowt ye was a gaffer noo!"

"Se aa is, man; se aa is. But aa syun fund aa wis ne use bossin' the men, se aa detarmined te gan to wark agyen mesel, and aa've hired yon chep to lyuk efter us." — *Scottish Nights.*

The Prater and Augarten, Vienna. — It is announced that, on the occasion of the fiftieth anniversary of his accession to the throne, which takes place in 1898, the Emperor Francis Joseph intends to present the Prater and the Augarten to the City of Vienna. Negotiations with this object in view have already been entered into. The Prater is the famous summer resort and pleasure-ground of the Viennese, and is one of the first sights shown to visitors. The Augarten likewise is an extensive pleasure ground, situated in a densely populated portion of the city. It was owing to the generosity of the Emperor Joseph II that the Augarten was originally opened to the public, and on the entrance portal the dedication "To Mankind, from its venerator, the Emperor Joseph" is still conspicuous. One of the principal clauses in the contemplated deed of gift will be that both the Prater and the Augarten are for all time and in all circumstances to remain what they are now — namely, public recreation-grounds for the inhabitants of Vienna. — *London Times.*

Birch-wood Spools. — Practically all the wood used in making spools for thread in this country and Great Britain is cut in Maine forests, but so great is the amount of lumber required each year for the making of these seemingly insignificant articles that Maine will not be able to supply the raw material much longer. The spools are made of birch-wood, and the birch of the Maine forests is the best for the purpose. More than two million feet of lumber is shipped to Scotland every year for the use of the great thread manufactories there, and almost as much is supplied to domestic manufacturers. The business began in Maine twenty-five years ago, and land that was cut over at that time is now well covered with young trees, but not for twenty-five years more will this timber be fit to cut. Birch timber is becoming scarce, and it will not be many years before thread-makers will have to look elsewhere than to Maine for their spool-wood. While it takes fifty years for birch forests to renew themselves, the crop is considered a profitable one. — *Philadelphia Telegraph.*

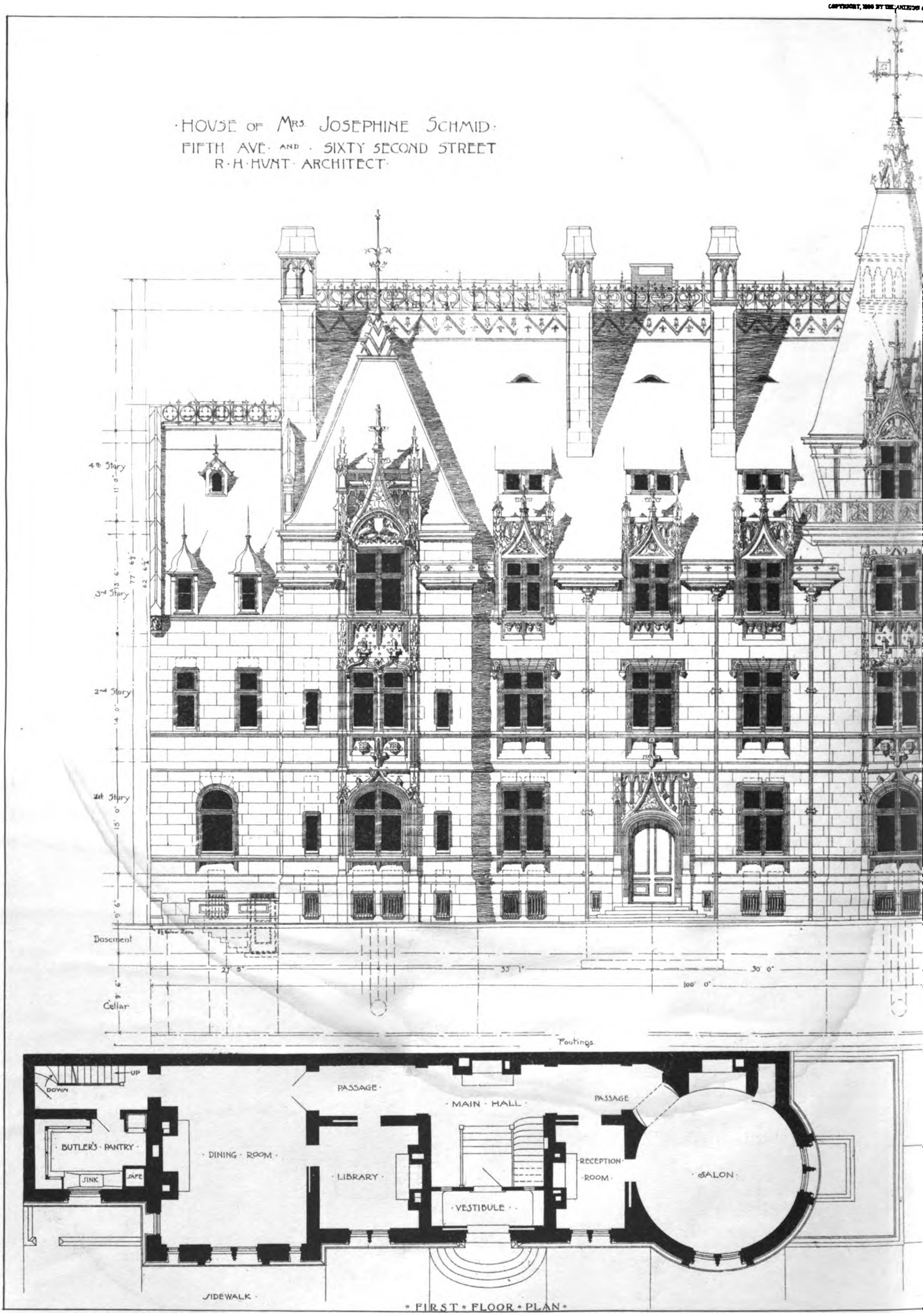
Did Varro invent Engraving? — It is a very odd fact that we have no authenticated portrait of Cicero, says the London *Standard*. This will be surprising news to most people, for more busts and statues are assigned to him than to any "Roman of them all," excepting the Cæsars; but antiquarian critics reject them all nowadays. They may be true, but there is no evidence. We may feel a comfortable certainty, however, that the familiar face and figure are correct. Cicero would not be restrained by indolence or modesty from sitting as often as he was asked. Every gentleman who took pride in his library would have the great man's bust in its place among the other authors, for such was the fashion. There was another fashion of the kind much more interesting. We are used to class engravings among the modern arts. But the Romans had a method of inserting the likeness of a writer in his book, which, to say the least, served the purpose of engraving. Martial and Seneca and Cicero allude to it; the invaluable Pliny gives a clear statement, but he does not seem to have understood the process. "By some means or other," says he, "Marcus Varro introduced the portraits of seven hundred individuals in his numerous books, as he could not bear the idea that all trace of their features should be lost." These illustrations were reproduced somehow, for "not only did Varro confer immortality" upon the author's features, "but also he transmitted them to all parts of the earth, so that anywhere it might be possible to see them." Pliny calls this a "most blessed invention," and if it were not engraving, what could it have been? The learned have been inquiring and debating for three hundred years, but they will never agree. Any day, however, Herculaneum may yield some old papyrus which will decide the question.

S. J. Parkhill & Co., Printers, Boston, U. S. A.

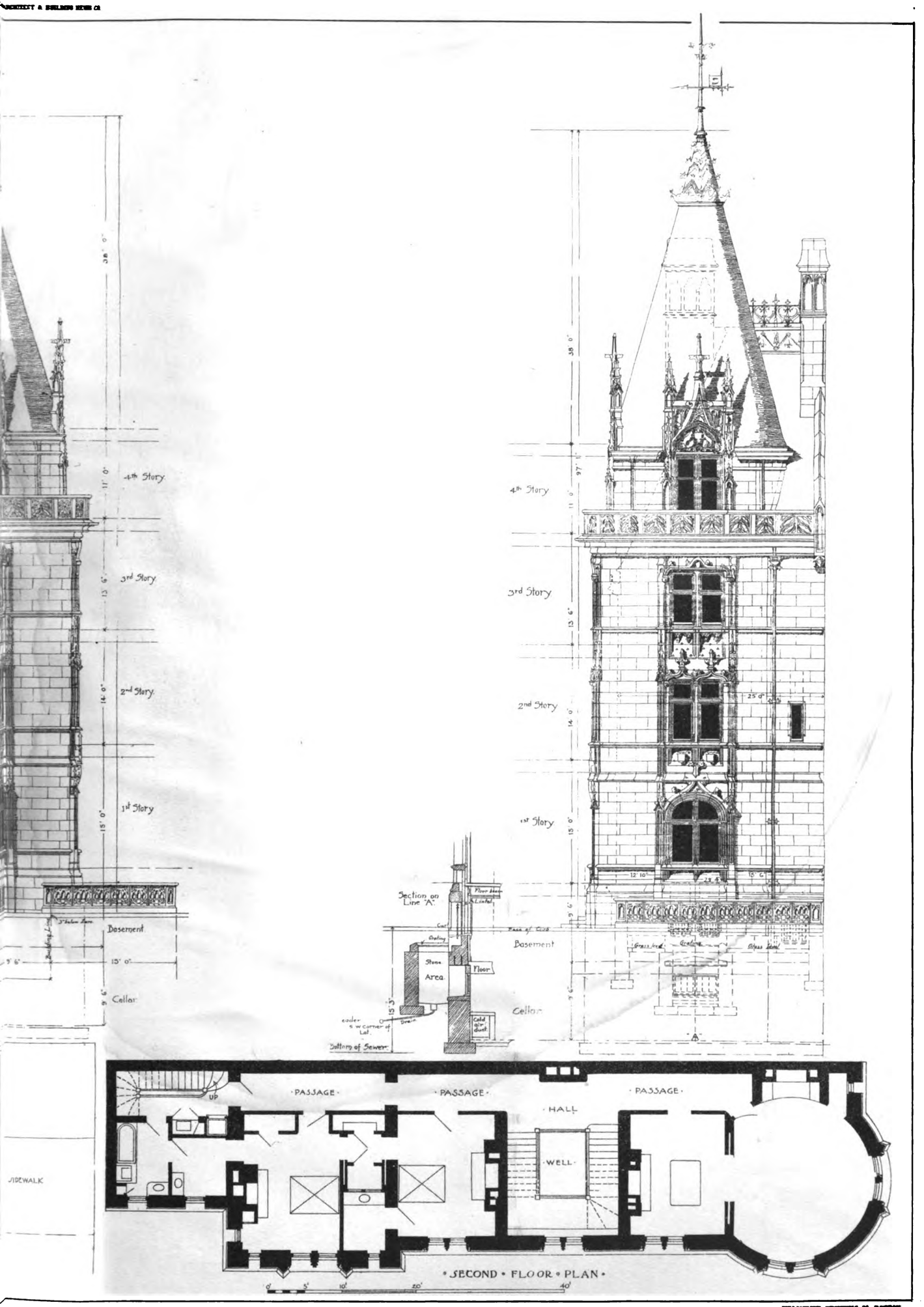
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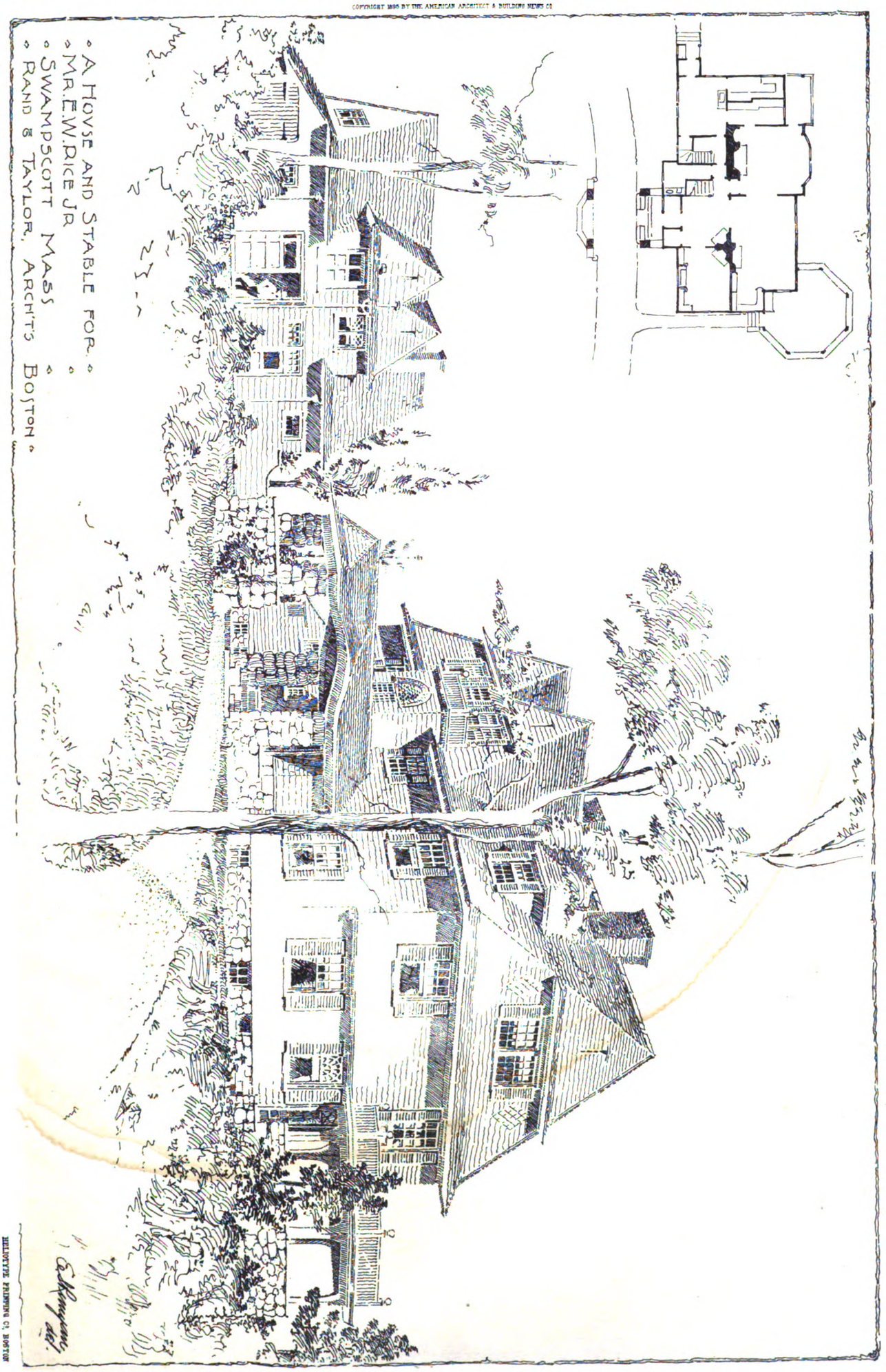


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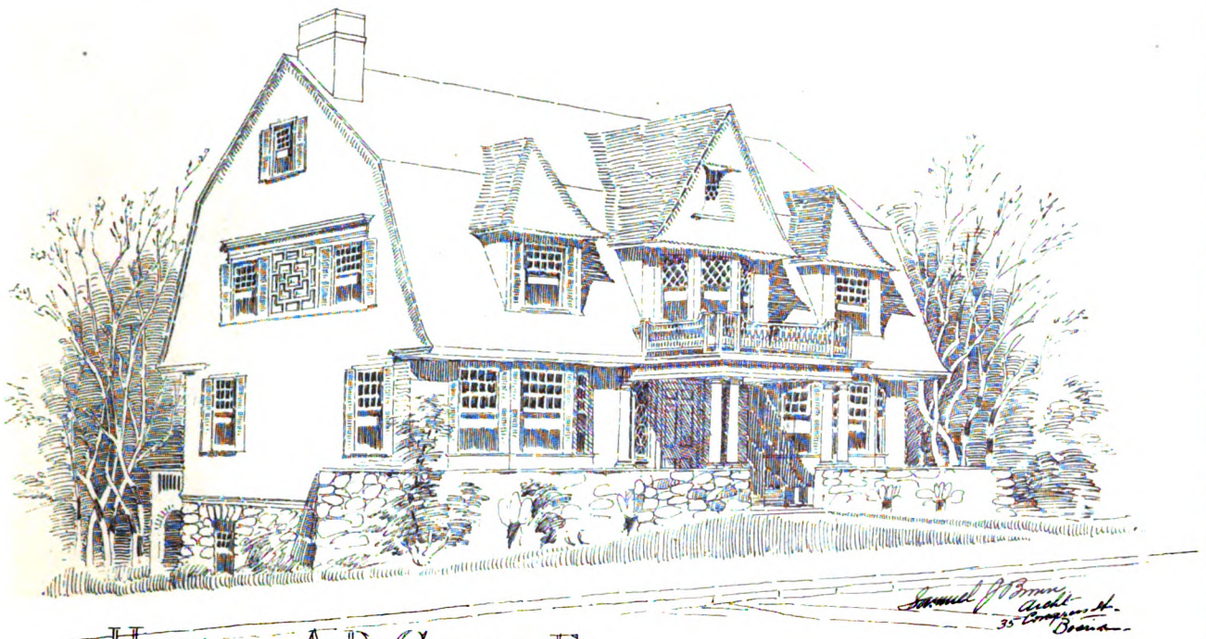


A House and Stable for
Mr. E. W. Rice Jr
Swampscott Mass
Rand & Taylor, Arch'ts Boston

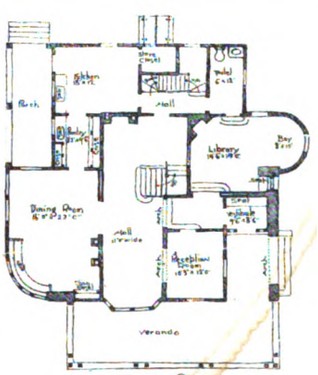
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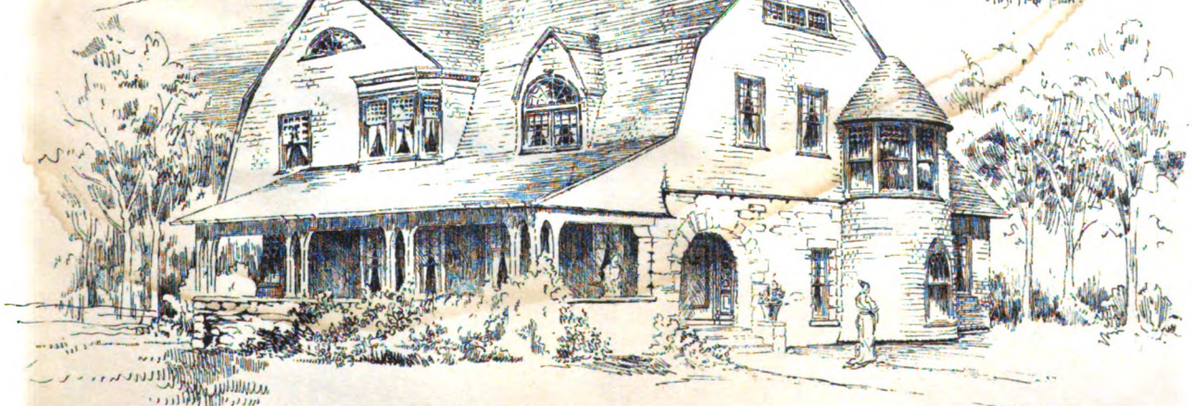
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HOUSE FOR A. D. CLAFLIN ESQ.
NEWTON CENTER, MASS.



First Floor Plan.



House at Buffalo, N.Y.
F. C. W. Ludrich, Architect
10 Broadway, New York, N.Y.

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PROPOSED HIGH SCHOOL BUILDING,
MIDDLETOWN, CONN.
ALTERNATE DESIGN.

F. R. COMSTOCK, ARCHITECT.
HARTFORD, CONN.

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IN · PROPOED · HOVSE · FOR ·
W·W·SMITH·ESQ·HARTFORD · CONN·
FR·COMSTOCK·ARCHITECT·
HARTFORD · CONN·

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THE Metropolitan Museum of Art, in New York, is rapidly adding to its precious resources for the study of sculpture and painting. The north hall of the new wing, which will be opened this season for the first time, is to be devoted to Classical sculpture. Of the three sections into which the hall is divided, the first will be filled with casts of Parthenon sculpture. The second section will contain casts of other Greek sculpture, and the third will be filled with Roman work. If the lighting of these rooms is as good as that of the other sculpture galleries in the Museum, the new wing should be a very Mecca for American art-students. Many other casts are in store, waiting for space in which to display them, and another wing is, it is said, soon to be added to the Museum for this purpose. According to the accounts in the New York *Tribune*, the thing now most to be desired for the Museum, after a liberal supply of money with which to carry on its noble work, is some sort of reform in the methods of handling freight at the wharves of the foreign steamship lines. Of the casts which have been so carefully selected, and so generously furnished by the great European Museums, hardly one, we are told, reaches its destination whole, although they are all carefully packed, in cases marked with the warning "Fragile." Of course, the skilful plaster-workers at the Museum can put together the fragments, but a restoration of this kind is not quite the same thing as a cast that has never been broken, and there is absolutely no reason why these precious objects should be so brutally treated. No doubt, they only suffer the fate of all the fragile objects which Fortune delivers to the tender mercies of American freight-handlers, but the abuse of delicate merchandise in our seaports has long been a scandal in the mercantile world. We have ourselves seen an open crate of earthenware, the contents of which could easily be seen, packed in hay, through the interstices of the crate, landed on the pier after a long railway journey, a voyage of three thousand miles, and three handlings, under English auspices, in perfect condition, only to have its contents reduced to a mass of fragments before it had been transported half a mile on American soil; and nearly every importer has similar stories to tell. We know a man who, like many other tourists, fell in love with the German porcelain stoves. He bought two, had them packed with extreme care, and shipped to this country. He might have sent them all around the world, to English or French or German ports, in safety; but it is different in America; and, when they reached him, both the stoves were broken into pieces so small that he could not find a fragment of either, as large as the palm of his hand, to keep for a memento of the American system of transportation. Where nothing but an importer's pocket is concerned, the rest of the world can, perhaps, look with complacency on these peculiarities of the American mercantile system; but where works of art, bought by charitable people for the benefit of poor students, are destroyed by the hundred, through being rolled end-over-end around the streets and piers, simply because that is the American custom, it is time for the friends of civilization to see if something cannot be done to ameliorate that custom.

A CURIOUS case, involving the still more curious question of the ownership of the space under the sidewalk in front of buildings, came up in New York a few days ago. It seems that Mr. Oscar Hammerstein bought, about six months ago, the old Seventy-first Regiment Armory, intending to build a theatre on its site. Attached to the armory was a long vault, under the sidewalk, which was used by the corps as a shooting-gallery. In the course of construction of the theatre, it was found that the vault, in which it was intended to place the engine and boilers, was not quite large enough, and that more room would be needed. Mr. Hammerstein thereupon petitioned the Board of Public Works for additional vault room, offering at the same time eighteen hundred dollars, which was the price, at the regular rate of seventy-five cents a foot, which the city exacts for the use of the ground below the sidewalks, for the additional space that he needed. The Board of Public Works refused to give the space asked for, on the ground that there was no record to show that the old vault was a part of the armory property purchased by Mr. Hammerstein, and that, if he wanted to use it, or make additions to it, he must pay the city for the whole of it. This Mr. Hammerstein refused to do. He had paid a million dollars for the armory property as a whole; the regiment had used the vault under the sidewalk for twenty-five years, and he thought that it was fairly included in his purchase. In order to test the question as quickly as possible, he sent his son to dig a hole in the sidewalk over the vault. The City authorities were on the lookout, and promptly arrested the young man, on the charge of having violated the City ordinance which holds the sidewalk, and the ground under them, to be the property of the City, unless the ownership has been duly transferred. Of course, the youth was immediately paroled by the judge before whom he was brought, and a decision is soon to be rendered. A special complication is introduced into the case, apparently, by the fact that the armory must have been State property, and the dealings between the State and the City would naturally be on a different footing from those between individuals.

THE *Review of Reviews* contains an article, by Louis Windmüller, on "The Careless Construction and Wilful Destruction of Buildings," which, apparently to suit it to the popular taste, is seasoned with so much careless misstatement that it ought not to go uncorrected. It is the misfortune of the time that the swarm of monthly magazines, which have, not perhaps entirely without advantage, superseded to a considerable extent more solid publications, find it necessary to compete with each other for making sales, by taking advantage of every occurrence which occupies the attention of the daily papers for a few days to produce disquisitions appropriate to the circumstances, made as startling as possible by reckless assertions made with an air of authority intended to impress the reader with their importance. Such an occurrence as the fall of the Ireland Building was sure to call out some of these dissertations, and Mr. Windmüller's is, perhaps, only more deserving of reputation because it appears in what is generally a considerate and honorable periodical.

MR. WINDMULLER begins by saying that "Our consular reports demonstrate that loss of life and property is far less abroad than it is here, although American firemen are considered superior. A chief cause is the hasty and reckless construction of dwellings"; and, farther on, he says that "In Germany, a special police watches over their erection, and examines the material placed in them; a Board, representing the Fire Department and local Government, has absolute

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power to order changes while the house is in course of erection, and it must not be utilized until it has been judicially approved as a whole when completed." Most people, after reading this, would suppose that building in Germany, under all this inspection and judicial approval, must be very well done, and it would probably surprise the subscribers to the *Review of Reviews* to learn that the fall of buildings, or parts of buildings, not as a result of fire, but from bad construction, pure and simple, is perhaps more common in Germany than in any other civilized country. It is true that German buildings, like Continental buildings generally, do not often burn down, the law making house-owners responsible for the consequences of the spread of fire beyond their own premises, which has been enforced on the Continent for centuries, having made uninflammable construction a fixed habit in all Continental cities; but in the matter of over-balanced cornices, or rotten masonry, or bad brick, or defective stone, the German builders can give lessons to almost any in the world. A superstition is prevalent here, similar to that received in regard to German building, that house construction in Paris is exceedingly solid and safe; yet the very worst building-work that we ever saw done anywhere was in Paris. We know something of what "skin" builders in New York can do when they try; but nothing that we have ever seen in New York was quite so bad as the masonry done under the strict laws and supposedly efficient supervision, of the Parisian Government. The fact is that it is utterly impossible to supervise building-work officially in such a way as to prevent defective construction. Even a clerk-of-works, constantly on the ground, cannot superintend more than ten men in such a way as to be able to say with confidence that a fault has not been committed which may cause the destruction of a building. It is so easy to leave out a few bolts in a truss or girder; or to make a fatal joint in a concrete foundation by allowing a little clay to work into it; or to increase the strain on a column to a dangerous extent by allowing a pebble to get into the cement in which it is bedded, that the wonder is not that supervision should be unable always to prevent accidents so much as that most buildings, notwithstanding the impossibility of detecting faults committed in their construction, are sound and strong. That they are sound and strong, and quite as much so in New York as in police-ridden Berlin, is simply because most building workmen are conscientious and intelligent, and, of their own accord, try to guard against possible dangers. Drunken and vicious workmen would build a bad and dangerous building though inspectors by the score stood by and watched them; and the best safeguard against bad construction is not, as Mr. Windmüller thinks, increase of inspection, but development of the conscience and sense of responsibility of the individual workman. How that development is to be brought about, we will not attempt to say, but it is certainly not by increase in the rigor of the building-laws.

ONE of our correspondents sends us a curious document, from the Superintendent of an Insane Asylum in the West, inviting the persons to whom it is addressed to "describe fully anything believed to be original, new in use, or in your opinion specially desirable," with a list of forty-six points, relating to arrangement, materials and equipment, and to details of hospital management, on which information is desired. In itself, the circular is innocent enough, and, if sent about among hospital superintendents, as was probably intended, it should bring valuable information; but the idea of addressing copies of it to architects was certainly not a happy one. An architect who had been particularly successful in planning such establishments would, with reason, think himself entitled to employment in designing the two new asylums which, as the circular informs us, the State is about to build; and would be very unlikely to expend his special knowledge gratuitously, for the benefit, possibly, of some ignorant professional rival; and, it is safe to say that the only information that will be obtained from architects on the subject of planning and materials will be furnished by people who know little or nothing, either of sound architecture or of hospital planning, and who simply seize the opportunity to make themselves conspicuous by a display of pretended science, invented for the occasion, with which they hope to impose upon the State authorities. The Superintendent who signs the circular apparently has much the same idea in regard to it, for he expressly says that the information is asked for at the desire of the Governor of the State.

IF we might offer a suggestion as to the best manner of securing what, as we are told, the Governor wishes — that embodiment in the new building of "whatever has been found best as to plans and construction," we should say that this end could be best attained by procuring, say, a copy of Burdett's "*Hospitals and Asylums of the World*," which contains plans of all the principal hospitals for the insane, adding, perhaps, other plans, from Trustees' Reports and similar documents. In this way might easily be accumulated a collection, containing plans of nearly every asylum in the civilized world. These plans should first be submitted to the medical authority which is to have charge of the administration of the new hospitals, for study, comparison and criticism. Architects do not need to be told that in asylum administration the medical world is divided into at least two camps. One of these favors what is known as the Dutch, or cottage system, in which the patients are divided into little separate households, on the ground that the comparative quiet and freedom from exciting conditions of these cottage sanitariums are so favorable to the cure of mental disorder that the great additional cost of attendance and administration should not be considered. The physicians of the other school, while recognizing the merits of the cottage system, think that large pavilions, accommodating from one to two hundred patients in each, are so much more economically carried on, and so much more easily kept under efficient supervision, that they are to be preferred. It is certainly not for the architect to say which of the two systems of planning is to be chosen. After the medical authority has made its choice, which it can do with a far greater knowledge of local circumstances, the character of the patients to be received, and the medical direction available, than any architect could possibly possess, it is time to call in a good and experienced architect, and discuss the details of the plans with him. Any architect who understands his business will know a good deal about the details of planning for the insane, as there are few architects who have not had something to do with asylum-building; so that, at this stage, the two professional men together will be in a position to make a satisfactory combination of the information which they both possess; and the construction of the buildings can follow in due course, with the certainty that they will "embody," as Governor Altgeld says, all the advantages that two competent experts can select from a comprehensive examination of all the best that has been done previously; and that they will not present, as is too often the case with hospitals for the insane, only the realization of a whim of some self-willed and half-instructed official, seconded by an ignorant and irresponsible architect.

THOSE of our readers who are fond of experiments in chemistry may like to pursue the investigation begun by Herr Strindberg, a Swedish chemist, who claims that iodine can be made synthetically from certain coal-tar products. He was led to this conclusion by noticing, during some photographic operations, that when he mixed pyrogallol and hydroquinone, for a developer, the hydroquinone gave out the characteristic odor of iodine. This circumstance led him to calculate the molecular weight of oxyhydroquinone, that is, hydroquinone with an atom of oxygen added. As a molecule of hydroquinone weighs one hundred and ten times as much as a molecule of hydrogen, and one of oxygen weighs sixteen times as much, an arithmetical operation of no great difficulty convinced him that a combination of the two would give a molecule weighing one hundred and twenty-six units. The atomic weight of iodine is one hundred and twenty-seven, according to the ordinary authorities, but this is so near to one hundred and twenty-six that the coincidence, together with the iodine-like smell, convinced Herr Strindberg that he had really succeeded in compounding a halogen out of carbon and water. That he will succeed in isolating the iodine so produced we hardly venture to hope; but, unless the smell that he took to be that of iodine was due to the escape of bromine from the sensitive film, which usually accompanies the action of the developer, it is certainly curious that a chemical action which might possibly lead to the formation of an organic compound with a molecular weight of one hundred and twenty-six should be accompanied by a smell resembling that of the vapor of a mineral element with an atomic weight of one hundred and twenty-seven.

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ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — XV.

THE NATIONAL CODE OF RULES FOR ELECTRIC WIRING. — VIII.

Class D.

ALTERNATING SYSTEMS. — CONVERTERS OR TRANSFORMERS.

33. CONVERTERS:—

a. Must not be placed inside of any building, except the Central Station, unless by special permission of the Underwriters having jurisdiction.

b. Must not be placed in any but metallic or other non-combustible cases.

c. Must not be attached to the outside walls of the buildings, unless separated therefrom by substantial insulating supports.

34. IN THOSE CASES WHERE IT MAY NOT BE POSSIBLE TO EXCLUDE THE CONVERTERS AND PRIMARY WIRES ENTIRELY FROM THE BUILDING, THE FOLLOWING PRECAUTIONS MUST BE STRICTLY OBSERVED:—

Converters must be located at a point as near as possible to that at which the primary wires enter the building, and must be placed in a room or vault constructed of, or lined with, fire-resisting material, and used only for the purpose. They must be effectually insulated from the ground, and the room in which they are placed be practically air-tight, except that it shall be thoroughly ventilated to the out-door air, if possible through a chimney or flue.

An explanation of alternating currents and of the laws regulating their action requires so technical a discussion that a simple statement of important facts will probably leave clearer ideas than would an attempt at an exposition.

With the alternating system the dynamo ordinarily generates a pressure of 1,000 or 2,000 volts. *Transformers* or *converters* are then used to change this pressure, at the place where the current is to be used, into a lower pressure of 50 or 100 volts. The pressure is high before the transformation is made and the current comparatively small; after the transformation the pressure is low and the current comparatively large. The available amount of energy is but little changed by this transformation or conversion; the current multiplied by the pressure (the number of watts) is virtually the same before as after.

This transformation is possible with alternating currents because of the principal called *induction*. Suppose (Fig. 72) a coil of wire *B* to be lying near, but not touching, another coil *A* in which a current may be started either in the direction of the arrows *c*, *c*, or in the direction of the arrows *d*, *d*. Without discussing the hypotheses made to account for the phenomena, it may simply be stated that if a current be started in coil *A*, a current will also flow momentarily in coil *B* if its ends be joined; if they be not joined there will be only a momentary electrical pressure between the ends of the coil. If the current in coil *A* be now changed in direction, there will be a momentary current in coil *B* in the direction opposite to that in which it flowed in the first instance. These currents in *B* are what are called *induced currents*. They last but a very short time, and if the current started in *A* be continued in the same direction, there is only the short rush of current in *B* at the starting of the current in *A*. To keep a current flowing in *B* it is consequently necessary to keep the current in *A* constantly alternating in direction. An alternating dynamo is so constructed that it will do this.

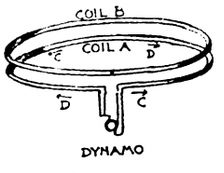


Fig. 72. Illustrating Induced Currents.

The coil *A* which is connected with the dynamo, and in which the current first flows is called the *primary coil*, and the coil *B* in which the induced current flows is called the *secondary coil*. The coils in Figure 72 have each but one turn of wire. The relation between the number of turns in the primary coil to the number of turns in the secondary coil determines the relative electrical pressures and the relative currents in the two coils. Thus, if there are 1,000 turns in the primary coil and 100 turns in the secondary, the ratio between the number of turns is 10 to 1 and the electrical pressure in the secondary coil will be one-tenth of that in the primary coil while the current in the secondary coil will be 10 times that in the primary coil. If, for instance, the pressure at the terminals of the primary in the case supposed is 1,000 volts and the current flowing is 10 ampères, then in the secondary the pressure will be 100 volts and the current will be 100 ampères. The rate of work in the two coils (the watts) will be the same; in the primary coil the number of watts will be 1,000 x 10 = 10,000 and in the secondary the number of watts will be 100 x 100 = 10,000. There is simply a transformation from high-pressure and small current to low-pressure and large current. The transformer has somewhat the effect that a reducing-valve has with gas when it allows a larger flow of gas at a lower pressure. It should be remembered, however, that with the electrical transformer there is no electrical connection between the two coils; there is a space between them and the current in the primary coil with its high-pressure is not free to pass to the secondary coil.

[1] Continued from No. 1026, page 76.

In practice the terminals of the primary coil are connected to the wires from the alternating dynamo, as in Figure 73, and the lamps are then connected in between the wires leading from the terminals of the secondary coil just as they would be on any other low-potential circuit. The two coils are surrounded by soft iron, since this greatly increases the effect and makes it possible to transform a large amount of energy in a comparatively small piece of apparatus. The two coils are compactly wound, thoroughly insulated, and placed near together, while iron plates are so formed that they will fill the space within and about the coils. The whole is then enclosed in a cast-iron case for protection against the weather and against mechanical injury.

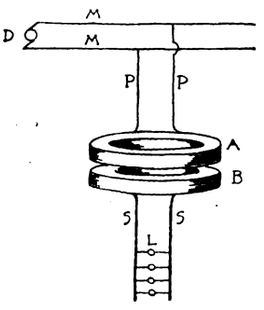


Fig. 73. Illustrating Transformer Connections: *D.* Dynamo; *M.* Mains; *P.* Primary Wires; *A.* Primary Coil; *B.* Secondary Coil; *S.* Secondary Wires; *L.* Lamp.

The great advantage of the alternating system is in the saving of copper in the street conductors. If, for instance, the rate of output of a station be 100,000 watts, by using the alternating current the voltage may be 1,000 and the current 100 (1,000 x 100 = 100,000), while if the direct current (one flowing constantly in one direction) were used and the pressure were everywhere the same as at the lamps, say 100 volts, there would have to be 1,000 ampères at 100 volts (1,000 x 100 = 100,000). But the amount of current that is forced through a given resistance is what determines the loss. For a given loss a smaller wire may be used for a small current at a high-pressure than for a large current at a low-pressure, although the energy in the two cases, as in the example cited, may be the same.

When passing through a resistance, alternating currents under certain conditions do not follow the law that holds with direct currents. The property of induction has an important effect and on account of it sometimes a very small alternating current will flow, where with a direct current there would be a short-circuit. Thus in the transformer (Fig. 73) when there are no lamps turned on and the secondary coil is consequently "open" almost no current will flow in the primary coil although it is "closed." If a few lamps be turned on so that the secondary coil is partly "closed" more current will flow in the primary and this current will increase or diminish in almost exact proportion to the number of lamps turned on in the secondary circuit.

Transformers or converters become somewhat heated even under ordinary conditions and it is possible, when a short-circuit occurs in the secondary circuit or when there is a defect in the transformer itself, for the temperature to become dangerously high. When a transformer "burns out" the smudge from the burning insulation will not infrequently cause considerable smoke damage. The primary wires may become a source of danger because they are connected to a generator of high electrical pressure so designed that it will furnish a heavy current at a constant pressure. There is some likelihood that lightning discharges will break through the insulation of the primary wires in the transformer and if this were to occur it would be better to have the transformer out of doors and mounted so that overheating could do no damage. For the foregoing reasons the underwriters have thought it best to exclude transformers from buildings wherever possible.

35. PRIMARY CONDUCTORS: —

a. Must each be heavily insulated with a coating of moisture-proof material from the point of entrance to the transformer, and, in addition, must be so covered and protected that mechanical injury to them, or contact with them, shall be practically impossible.

b. Must each be furnished, if within a building, with a switch and a fusible cut-out where the wires enter the building, or where they leave the main line, on the pole or in the conduit. These switches should be inclosed in secure and fireproof boxes, preferably outside the building.

c. Must be kept apart at least ten inches, and at the same distance from all other conducting bodies when inside a building.

36. SECONDARY CONDUCTORS:—

Must be installed according to the rules for "Low-potential Systems."

The construction of the primary circuit must be in accordance with the rule for high-potential circuits (Sections 10, 11, 12,) except that Rule 35 (*c*) requires even greater distance between wires.

All the reasons for the use of service switches with arc-light circuits, and for the use of service switches and main fuses with low-potential circuits, apply with even greater force to their use with alternating circuits, for the electrical pressure is high and the current is not limited by the regulation of the dynamo as it is with constant-current series circuits.

Class E.

ELECTRIC RAILWAYS.

37. ALL RULES PERTAINING TO ARC-LIGHT WIRES AND STATIONS SHALL APPLY (SO FAR AS POSSIBLE) TO STREET RAILWAY POWER-STATIONS AND THEIR CONDUCTORS IN CONNECTION WITH THEM.

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38. Power Stations: —

Must be equipped in each circuit as it leaves the station with an *approved* automatic "breaker," or other device that will immediately cut off the current in case the trolley-wires become grounded. This device must be mounted on a fireproof base, and in full view and reach of the attendant.

[Section *a*. Automatic circuit-breakers should be submitted for *approval* before being used.]

Electric railways are ordinarily operated at an electrical pressure of 500 volts, which the rules classify as a "high-potential"; the generators are designed to maintain this pressure constant and as they are usually of great power, a tremendous current will flow when a short-circuit occurs. For these reasons the same construction is required as that specified for arc-light purposes.

An *automatic circuit-breaker* is a device for breaking connection between the generators and the outside lines. It performs the same service as a fuse, but operates instantly when there is an excessive current, while a fuse requires time to heat sufficiently to melt. The automatic breaker is operated by the current that flows out to the lines. The current passes through the wire on an electro-magnet and this magnet becomes stronger as a larger current passes. The breaker is so adjusted that when the magnet reaches a certain strength a piece of iron is pulled toward it, and this iron piece is so attached to a sort of trigger that a spring will be released and left free to force open a switch. Figure 74 shows the principle of an automatic breaker. In a practical form it must be so arranged that the arc formed upon opening the circuit cannot continue, and precaution must be taken that the parts to be moved will not stick. This arc has a great heating-power and the whole piece of apparatus should be mounted on a non-combustible base.

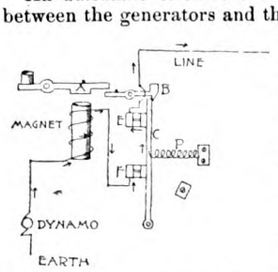


Fig. 74. Showing Principle of Automatic Circuit Breaker. An excessive current makes the magnet attract *A*. *A* strikes *B* thus releasing *C*, which is pulled out by the spring *D*. A gap is then left in the circuit between *E* and *F*.

39. Trolley Wires: —

a. Must be no smaller than No. 0, B. & S. copper or No. 4, B. & S. silicon bronze, and must readily stand the strain put upon them when in use.

b. Must be well insulated from their supports, and in case of the side or double-pole construction, the supports shall also be insulated from the poles immediately outside of the trolley-wire.

c. Must be capable of being disconnected at the power-house, or of being divided into sections, so that in case of fire on the railway route the current may be shut off from the particular section and not interfere with the work of the firemen. This rule also applies to *feeders*.

d. Must be safely protected against contact with all other conductors.

40. Car Wiring: —

Must be always run out of reach of the passengers, and must be insulated with a waterproof insulation.

41. Lighting and Power from Railway Wires: —

Must not be permitted, under any pretence, in the same circuit with trolley-wires with a ground return, nor shall the same dynamo be used for both purposes, except in street railway-cars, electric-car houses, and their power-stations.

42. Car-houses: —

Must have special cut-outs located at a proper distance outside, so that all circuits within any car-house can be cut out at one point.

43. Ground Return Wires: —

Where ground return is used it must be so arranged that no difference of potential shall exist greater than five volts to 50 feet, or 50 volts to the mile between any two points in the earth or pipes therein.

Feeders are the wires that lead from the station to points where current is taken off by the different branches. If all the current required to operate a large street-railway had to be conducted from the station through the trolly-wires, either these wires would have to be of tremendous size, or else there would be great loss in forcing a large current through a small wire. If the wires were small they would greatly overheat, and the pressure would be different at different parts of the system. After a large current had been forced through the trolley-wire there would not be so much energy left to operate the cars. Where much current is needed it is consequently the practice to use the trolley-wire only as a sort of local conductor to carry current from the ends of the feeders to the cars (Fig. 75).

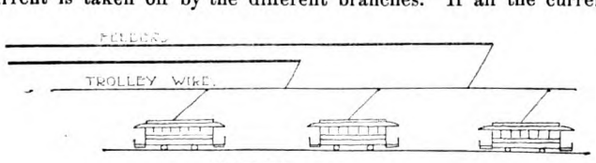


Fig. 75.

Street-railways that use a trolley running along a wire overhead almost invariably make the rails and the earth serve as return conductors to the station. Figure 76 shows the connections and also indicates a motor being operated from the trolley line. Quite aside from any danger, it is unsatisfactory to take current for power and light from a street-railway trolley-wire, because the electrical pressure varies when the current taken by the cars varies, and because when for any reason the circuit-breaker at the station cuts off the current from the line, the service is interrupted. It is more dangerous to operate power or lights from a trolley line than from a regular power or light circuit, for many reasons.

One side of the circuit is always connected with the earth. With other circuits every precaution is taken to keep both wires thoroughly insulated from the earth, but with the trolley circuit one side is grounded intentionally, permanently, and as well as possible. Where both wires of a circuit are insulated from the ground, to have trouble with earth connections it is necessary to have *two* connections with the earth, one on *each wire* at the *same time*. With a trolley circuit a bad leak or short-circuit is caused by *one* connection between the one wire and the earth at *any time*. With any circuit the electrical pressure is constantly striving to force current through the insulation: there are always minute leaks. When the pressure is doubled these minute leaks double and are much more likely to become rapidly worse. With a circuit having both wires insulated, only half the total pressure is acting to break down the insulation on each wire; where one side of the circuit is grounded the total pressure is acting to break down the insulation on the single wire. With a grounded circuit there is likely to be more trouble from lightning because there is a connection to the earth through motors and lamps. The discharge in passing through these is apt to cause damage. It is difficult satisfactorily to operate motors from the trolley wire when a proper fuse is used, because the fluctuations in the pressure cause the motor often to take rushes of current that will melt the fuse unless it be too large for good protection.

The foregoing are the principal reasons why light and power from trolley lines are so strongly objected to by the underwriters. Incandescent lamps would also be prohibited by Rule 14 (*c*) because with a 500-volt circuit it is necessary to connect five lamps in series and there is thus a multiple-series system. Of course it does not make an insulated metallic circuit if two wires are run from the motor to the power-house, because the only change this makes is the connection of one wire to the earth at the dynamo instead of at the motor.

Figure 76 also illustrates the way in which the current in a trolley circuit returns to the generator. A part returns through the rails, a part flows into the earth and returns through buried pipes, moist earth or any other conducting substance. This return current divides according to the conductivity of the different paths. Since there is resistance it takes a part of the pressure of the dynamo to force this current from the car back to the dynamo; thus there will be a difference of pressure between any two points in the return circuit, say between *A* and *B*. If a gas-pipe should run near the point *A* and a water-pipe should run near the point *B*, and if these two pipes should touch each other somewhere, there might be dangerous arcing due to the current finding its way back through the pipes. This is one of the reasons for Rule 43. The other and greater reason is that if there are considerable differences of potential there is destructive action called *electrolysis* wherever the current leaves the pipe for the earth, as at *C*, Figure 76. The iron of the pipe is carried away into the earth toward the negative pole of the generator just as in a silver-plating battery the silver is carried away from a silver plate toward the article to be plated which is attached to the negative pole of the battery.

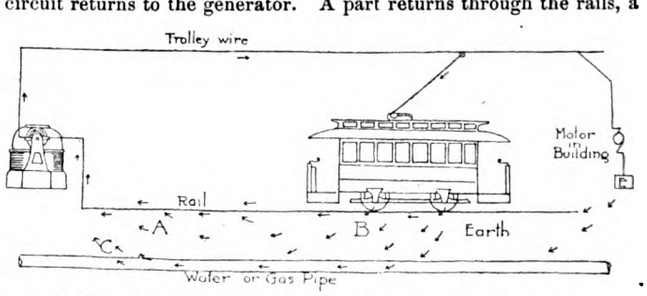


Fig. 76. Illustrating Street-railway Circuit and Paths taken by Current.

Class F.

44. Storage or Primary Batteries: —

a. When current for light and power is taken from

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primary or secondary batteries, the same general regulations must be observed as applied to similar apparatus fed from dynamo generators developing the same difference of potential.

b. All secondary batteries must be mounted on *approved* insulators.

[Section *b*. Insulators for mounting secondary batteries to be *approved* must be non-combustible, such as glass, or thoroughly vitrified and glazed porcelain.]

c. Special attention is directed to the rules (Rule 21) for rooms where acid fumes exist.

d. The use of any metal liable to corrosion must be avoided in connections of secondary batteries.

In a *primary battery* an electric current is produced by chemical action. If, for instance, a copper plate and a zinc plate are placed in a jar containing dilute sulphuric acid, chemical action produces an electrical pressure between the two plates and if they be connected by a wire or other conductor forming a circuit, a current will flow. Batteries for operating the telegraph, call-bells, burglar-alarms, etc., are primary batteries.

One form of *secondary* or *storage battery* is made by placing lead plates and sulphuric acid in a suitable jar and then forcing a current through the lead plates and acid. When the current passes, the lead plates are chemically changed, so that if after a time the battery be disconnected from the circuit by which current is furnished, it will act like a primary battery and will produce an electric current when connected to a circuit of wires or other conductors.

Batteries may be connected so that they will give a high electrical pressure or a large current, or both, and the same precautions are to be taken with the wiring that would be taken if the current were coming from a dynamo. With primary batteries the pressure is ordinarily very low and the current very small, so that as far as danger from fire is concerned, little care need be taken.

Secondary batteries are mounted on insulators because salts formed by the chemical action frequently creep over the surface of the jars and there would be leakage of electricity if the jar were not properly insulated.

Acid fumes are often produced by batteries and care must be taken that such action will not destroy the insulation or injure apparatus.

If the metal used about secondary batteries were to corrode and waste away, the carrying-capacity of the conductors would be lessened and excessive heating might occur.

45. MISCELLANEOUS:—

a. The wiring in any building must test free from grounds; *i. e.*, each main supply-line and every branch circuit shall have an insulation resistance of at least 25,000 ohms, and should have an insulation resistance between conductors and between all conductors and the ground (not including attachments, sockets, receptacles, etc.), of not less than the following:—

Up to	10	ampères.....	4,000,000
" "	25	"	1,600,000
" "	50	"	800,000
" "	100	"	300,000
" "	200	"	160,000
" "	400	"	80,000
" "	800	"	22,000
" "	1,600	"	11,000

All cut-outs and safety devices in place in the above.

Where lamp-sockets, receptacles, and electroliers, etc., are connected, one-half of the above will be required.

This testing can, of course, be done satisfactorily only by those familiar with electrical instruments. All insulation allows minute leakage; that is, the resistance of the insulation is never infinite. It is not safe to allow more than a certain small amount of leakage to a given length of conductor. An installation requiring only 10 ampères of current will presumably be a small one and the circuit a short one. For this reason a higher insulation resistance is required for a wiring system where the maximum normal current used is 10 ampères, than for one where it takes 1,000 or 2,000 ampères to supply all lamps. This insulation test is useful as an indication, but it has principally a negative value. A low resistance indicates a fault, but a high resistance does not necessarily show perfect construction. There might be an air space of a thousandth of an inch between a wire and a pipe and this would prevent an indication of low resistance, but a jarring of the building might afterward bring the wire and the pipe into contact and cause a disastrous short-circuit.

b. Ground-wires for lightning-arresters of all classes, and ground-detectors, must not be attached to gas-pipes within the building.

c. Where telephone, telegraph or other wires connected with outside circuits are bunched together within any building, or where inside wires are laid in conduit or duct with electric light or power wires, the covering of such wires must be fire-resisting, or else the wires must be enclosed in an air-tight tube or duct.

d. All conductors connecting with telephone, district-messenger, burglar-alarm, watch-clock, electric-time, and other similar instruments, must be provided near the point of entrance to the building with some protective device which will operate to shunt the instruments in case of a dangerous rise of potential, and will open the circuit and arrest an abnormal current flow. Any conductor normally forming an innocuous circuit may become a source of fire-hazard if crossed with another conductor, through which it may become charged with a relatively high pressure.

WIRE-PROTECTORS.

[Protectors must have a non-combustible, insulating base, and the cover be provided with a lock similar to the lock now placed on telephone apparatus or some equally secure fastening, and be installed under the following requirements:—

1. The protector to be located at the point where the wires enter the building, either immediately inside or outside of the same. If outside, the protector to be inclosed in a metallic waterproof case.

2. If the protector is placed inside of building, the wires of the circuit from the support outside to the binding posts of the protector to be of such insulation as is approved for service wires of electric light and power, and the holes through the outer wall to be protected by bushing, the same as required for electric light and power service wires.

3. The wire from the point of entrance to the protector to be run in accordance with rules for high-potential wires; *i. e.*, free of contact with building, and supported on non-combustible insulators.

4. The ground-wire shall be insulated, not smaller than No. 16 B. & S. gauge. This ground-wire shall be kept at least three (3) inches from all conductors, and shall never be secured by uninsulated double-pointed tacks.

5. The ground-wire shall be attached to a water-pipe, if possible; otherwise may be attached to a gas-pipe. The ground-wire shall be carried to and attached to the pipe outside of the first joint or coupling inside the foundation walls, and the connection shall be made by soldering, if possible. In the absence of other good ground, the ground shall be made by means of a metallic plate or a bunch of wires buried in a permanently moist earth.]

Ground-wires for lightning-arresters and ground-detectors are not to be attached to gas-pipes within a building, because if there were heating or arcing at the point where the wires are joined to the pipe, the gas-pipe might be burned through and the gas ignited.

Where wires are bunched together there is liability that they may become connected accidentally or on account of moisture. If there were bad leakage from one wire to another, the insulating covering might catch fire and carry it to the building. Rule 45 (*c*), consequently, requires that such wires be covered with fire-resisting material, or else that they be enclosed in an air-tight duct so that if a fire do occur it cannot have air to support combustion and cannot extend to the building.

An instrument is "shunted" when a by-path is formed round it so that the current will have a path other than that through the instrument. A high electrical pressure on telephone, burglar-alarm, or similar circuits, which do not have to be particularly well insulated, is likely to break down the insulation and cause heating at the break. Protective devices lead these high-potential currents to the ground before they get to the wiring in the building. The rules for installing protectors are given in detail in the note under 45 (*d*). Since the protector is to carry off a current forced by a relatively high pressure, all the wiring from the protector to the ground is done with the same care that would be used to install a high-potential circuit, so there will be no leakage to the building and no burning of gas-pipes.

e. The following formula for soldering-fluid is suggested:—

Saturated solution of zinc.....	5 parts.
Alcohol.....	4 parts.
Glycerine.....	1 part.

MATERIALS:—

The following are given as a list of non-combustible, non-absorptive, insulating materials, and are listed here for the benefit of those who might consider hard-rubber, fiber, wood, and the like, as fulfilling the above requirements. Any other substance which it is claimed should be accepted, must be forwarded for testing before being put on the market:—

1. Thoroughly vitrified and glazed porcelain.
2. Glass.
3. Slate without metal veins.
4. Pure sheet mica.
5. Marble (filled).
6. Lava (certain kinds of).
7. Alberene stone.

RUSSELL·ROBB.

[The end.]

AN ARCHITECTURAL SCHOOL FOR SAN FRANCISCO. — Arrangements have been made for a practically free architectural school at the Mark Hopkins Institute in San Francisco. It will be under the direction of Prof. B. R. Maybeck of the University of California. A class in Free-hand Drawing has been organized under H. T. Bestor, another in Architectural History under G. H. Sanders, while G. W. Percy will have one in Construction. The teachers give their services free. The proposed course will extend over three or four years. — *N. Y. Times.*

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A SYLLABUS OF EARLY CHRISTIAN, ROMANESQUE AND GOTHIC ARCHITECTURE.[1] — III.

THE EVOLUTION OF VAULTING.

THE only satisfactory kind of roofing is naturally the vault, beginning in the crypt, the narrow passages and the aisles, the apse being already vaulted. This changes the whole character of the building, makes it more dependent upon calculation, less upon chance, and the vaulted church is therefore by far a more complete, a more rational product than the one with wooden ceiling. The vaulting of the nave was the accomplishment most sought for, but represented the greatest, and as it seemed for a long time an almost insurmountable, difficulty.

The great danger of fire and moisture to which the wooden ceiling is exposed called for preventives. Besides, the interest for perfection and beauty in an edifice is closely related to the desire for its preservation. The art of vaulting was probably never quite forgotten. Vaulted buildings were still existing, mostly as ruins, in the old Roman provinces. In France Nîmes and Arles, and in Germany Trier, still possess a goodly number of monuments. The aqueducts and bridges all over the territory gave lessons in vaulting for practical purposes; most frequent among these were the *tunnel* and the *groin vault*. Nothing, however, was so effective in bringing about an improvement in this respect as the example of satisfactory vaulting presented in the *concentric* structures, such as the imperial chapel Charlemagne himself built at Aix-la-Chapelle. This chapel was looked upon as a wonder and a model of constructive ingenuity. Besides being the necessary consequence and conclusion of the concentric principle, the vaulting preserved the edifice uninjured by time and weather through centuries. Even in the Carolingian period there was serious thought of vaulting the basilica.

The vault is composed of arches. The arch almost exclusively used in vaulting during the Romanesque period was the *semicircular*, but in cases where a great constructive efficiency was demanded, *e. g.*, in vaults of great span, the *pointed* arch was, sometimes and in some places, introduced to increase the stability of the vault. The pointed arch, compared with the semicircular, has this peculiarity, that its surface nowhere presents horizontal or almost horizontal lines where the arch may prove inefficient to carry loads and break down.

DIFFERENT KINDS OF VAULTING ARE:

1. The *tunnel* or *barrel vault*, being either semicircular or pointed, used sometimes in a transverse position — the so-called *bridge-vault* — semi-tunnels over aisles.
2. *Groin* or *cross vault* (the groins crossing diagonally), constructed upon the principle of two intersecting tunnel-vaults, the edges where they meet being termed the groins. These groins in the later part of the period, especially in Northern France, are marked out by ribs. The groin-vault can be either:
   a. Quadripartite over square, rectangular or trapezoidal bays, or
   b. Sexpartite, one bay of centre aisle corresponding to two bays of side aisles.
3. Another kind of intersecting vault is the so-called *cloister-vault* differing from the cross-vault by the angles receding, while in the latter they project.
4. The *pendentive dome* over square bays, *e. g.*,

Dome over rectangular bay in the Cathedral at Pisa.

The pendentive dome is semicircular or polygonal. The octagonal cloister-vault and the polygonal dome are hardly different from one another. A peculiar kind of dome is the so-called Angevin vault, a combination of the cupola with the system of ribs.

5. *Half dome* over apse.

Vaulting is made difficult not only by its construction, which has to provide against the falling-in of the vault, but also because of its exercise of a powerful vertical and lateral thrust which has to be counteracted by sufficient strength in the wall or pier, or whatever member of the construction forms the chief support. In the tunnel-vault the thrust is exercised equally along the whole line, while in the groined vault it is mainly reduced to four chief points where it has to be efficiently met.

The *tunnel-vault* being the simpler and for the inexperienced builder the more comprehensible of the two, it is the first one to be commonly used, especially in *Southern France*, where vaulting was really settled upon as a necessity before the horizontally-ceiled basilica had time to be developed to any degree of perfection. The difficulty, however, of giving it any great span without endangering its stability, put the tunnel-vault decidedly at a disadvantage and taxed the inventiveness of the constructors. It is in these *early cruciform structures of one nave and small proportions*, that the first attempts at a rational abutment are met with. The vault is supported by heavy walls and standing buttresses to which in the interior correspond pilasters and transverse arches, a construction perfectly logical and influenced by Roman models. In some cases the abutment is even confined to the interior, forming side chapels within the nave, a peculiar refinement interesting to observe in that age. In this style of building and to heighten its effect, the application of *a pendentive dome* over the intersection of nave and transept is not uncommon.

This attempt is superseded in some provinces by the erection of *large edifices of the same type crowned with a row of pendentive domes*, one over each compartment. These form another peculiar group of buildings, half Byzantine in conception, still truly Romanesque in execution and, nevertheless, in their *ensemble* pointing towards another ideal to be reached, almost a renaissance before the Renaissance.

The constructive axiom, that the side thrust of a structure increases with its height, made it a matter of serious study in the case of the tunnel-vault how to erect basilicas. If there was to be more than one nave and the central one of any considerable height, the *aisles had to be raised* above the ordinary, or if this was not easily accomplished a *second story* could be added to the aisles to give the nave sufficient support. In both cases the aisles would be carried so high as to leave no space for admission of light. The power of the *galleries* thus introduced in the second story of the aisles in lighting the upper part of the nave was very small and the nave remained, accordingly, dark and gloomy.

In all structures, abutment is to some extent performed by the aisles. These are natural supporters of the nave as are transept and towers of the whole edifice. In this particular instance the aisles proved very effective, especially if the semi-tunnels could be made to spring from a point high enough to bring all their force to bear upon the nave.

Less heavy to handle, but possessing peculiarities that also called for ingenuity, was *the groined* or *cross vault*. The difficulty connected with this was in its way serious enough, but at the same time it satisfied better the demands of the time and became the more popular. Here the elements were heterogeneous and presented conflicting forces to be subjugated.

The groined or cross vault was probably first used in vaulting the crypts. In France the aisles were cross-vaulted at a time when the horizontal ceiling still prevailed for the nave. The problems to be solved by the Romanesque builders were (1) the stability and satisfactory character of the vault employed at a considerable height and span, such as in the middle nave, and (2) its application in spaces of different and irregular size.

In a *square* compartment vaulted by semicircular arches the intersecting lines or groins will naturally form — not a semicircle, but an ellipse, and thus offer grave weaknesses that may result in disaster. In order to prevent this, the groins had to be made semicircular by raising the apex of the vault and bulging the cells, a process which is said to "dome" the vault. The vaulting of an irregular space proved another problem. The semicircular arch has no capacity for adapting itself to spaces of different size. In a *rectangular* compartment, such as may easily be found even in the nave, the arches spanning the longer side differ in height and width from those spanning the narrower. In rising toward the apex the latter will in no wise compete successfully with the broader ones, but make the vault most uneven and unsightly. To remedy this it was decided to raise the level of the smaller arches either by making them elliptical or by stilting them, the latter to be preferred. The same problem occurs in the vaulting of *trapezoidal* compartments. This was met in various ways, the difference between the arches being equalized by making the larger one segmental, or by stilting the small one, or by letting the broader arch spring from a lower level, etc. The results may be deemed interesting in many cases although neither ideal, nor easily accomplished.

In spite of the fact that the builders of Southern France at last succeeded in making a basilica of the tunnel-vaulted structure, the only kind of vaulting which as a matter of course admitted light through the windows in the nave, and thus solved one great difficulty, was the cross-vault. Therein consists its chief and conquering quality which enables it to supersede all others, the basilica being the time-honored and universally preferred type of church-building.

Besides, from the point-of-view of final development, the use of the cross-vaults throughout the structure is almost a necessity. The tendency of all style hitherto had been towards a clear, although moderate, expression of the constructive agencies. In Romanesque art this is already done in the regulation of the ground-plan, the definition and grouping of supports, the vertical memberment that more or less supersedes and outshines the horizontal. The sense for logical disposition and exchange of forces demands a stricter calling into service of the truly constructive parts and reliance upon them. In the structures with wooden ceiling the absence of organism calls for an articulation of the constructive activity of the wall, in the structures with vaulting (except the cross-vault) the vertical memberment is more urgently pronounced, but horizontalism — by the very nature of these vaults — is still supreme.

In the application of the cross-vault, however, the vertical element is pronounced superior and the constructive struggle temporarily brought to a close. With the cross-vault it is the task to abut the points where the thrust consolidates. In the *interior* this is done by the large piers which are either raised to the point where the vault springs or from where strong shafts (in cluster or in a single body) rise to meet the arches of the vault. In the case of the larger squares of the ground-plan when the sexpartite vault is mostly employed, an intermediate shaft corresponds at once to the more slender support below and the intermediate arch above. The intersecting lines of the vault are the final interaction of the forces that separately

[1] Continued from No. 1027, page 88.

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and still not disconnectedly undertake the support below. In the *exterior* the abutment is not performed with so much consistency. For the lower stories the standing buttress occurs frequently, but as far as the clerestory wall is concerned, no other abutment is used but that contained in the vaulting of the galleries. A single strip of vault, such as an isolated arch fixing upon the real point of thrust and leading the latter to the wall of the aisle, occurs only rarely and hidden under the roof. The time for these forces to become detached from their original element has not yet come. That they are still somewhat latent in their action is due to the reluctance Romanesque style shares with many other styles towards accentuating the particular at the expense of the general, and its preference for the wall and the vault as the main and safest support and quiet background for the active life of architectural member-ment.

M. WERGELAND.

[To be continued.]

MATHEMATICS AND CONSTRUCTION IN "THE ÉCOLE DES BEAUX-ARTS."[1]

THE reputation of the Architectural Department of the École des Beaux-Arts of Paris is based almost wholly on its strength in design. The curriculum, however, necessarily includes a fairly thorough course in mathematics and construction, because graduates of the school are granted diplomas permitting them to practise architecture. Nominally they are also required to have had two years of office practise, but in reality a few weeks suffice.

The students are divided into two classes, known as first and second, and to pass from the second to the first fifteen "mentions" are necessary. They are one each in mathematics, descriptive geometry, stereotomy, construction, perspective, modelling and archæology, two in drawing and six in architecture. A bright student will accomplish this work in about two years, but it is possible for one who enters in March to do it in sixteen months. The first five mentions, which represent rather more than half the work, are the subject of this paper.

The instruction is given entirely by lectures which are an hour in length and usually come no oftener than twice a week in any subject. A French lecturer includes much more in a lecture than do our professors and the result is that the subject is less thoroughly grasped by the pupil. It is hoped that the reader will be able to form some conception from the number of lectures in a course and from the problems and drawings required during it and on examination of how carefully the ground is covered. The examinations will serve as the best criterion of the thoroughness attained. Merely outlines of the problems are given and without the details the reader will be apt to conceive them as simpler than they really are.

Of course any wording offers considerable opportunity for different interpretations of the amount of work expected, but there is such a spirit of competition pervading the school that the fullest interpretation usually results. In forming an opinion of the course the reader must bear in mind that all subjects are taught from the standpoint of their application to the study or practice of architecture, and everything not having a direct bearing on the subject has been eliminated from the curriculum.

The examinations are oral, but are supplemented by problems worked "*en loge*," which means that the student is assigned to an alcove and required to work out a problem in a specified time, varying usually from six to twelve hours.

The course in mathematics comprises about thirty-six lectures and includes the subjects of algebra, trigonometry, conic sections, analytical geometry and mechanics. The algebra includes equations as far as the solution by successive approximations of numerical equations of the third degree, decreasing geometrical progression, logarithms and interest.

Trigonometry includes the solution of plane triangles in general, the calculation of triangles by logarithms and the relation between a plane in space and its projection.

Conic sections receive much more attention than the two preceding branches. Quite a careful study is made of the curves resulting from the intersection of the cone and cylinder by a plane, and of practical methods of drawing them, and tangents to them; also of methods of measuring surfaces and volumes frequently met with in construction.

Analytical geometry is only touched upon and is taught mainly for its application to the curves of flexure of beams. It includes the curves of the second degree except the hyperbola, equations of the line and circle referred to polar coördinates, and in geometry in space, the equation of the line and plane and the angle between two planes.

Mechanics includes only statics and simple machines. Under the first are considered parallel and concurrent forces, composition of forces, parallelogram of forces, couples, moments, general equations for equilibrium, centres of gravity and resolution of forces; under the second, the lever, ballance, pulley, tackle, windlass, gears, inclined planes, the wedge, screw, and various applications.

The examination on this course in mathematics and mechanics is both written and oral. The written one usually consists of two questions, one of which is almost always the solution of a triangle and the other on mechanics. The oral is about three questions chosen at random.

As a course in mathematics it is certainly very incomplete; whether as a course specially designed for students of architecture it is also incomplete is a subject affording ample opportunity for discussion. Enough is included to suffice for the courses which are to follow, and the deficiency seems to be more in drill than in subject matter. Though the French seem to have found it sufficient to answer the actual needs of an architect, the American practice of adding a little more for the sake of the mental drill is a most excellent one.

In contrast with it is the course in descriptive geometry, which is very thorough, being the principal basis of stereotomy and perspective. The course includes fifty or sixty lectures, of which about ten are a review of the part required for entrance and ten on the finding of the most common shadows.

The best conception of the course is to be obtained from the examination questions, a list of which, divided into six series, is furnished to the students. The oral examination, part of which comes at the middle of the course, is on questions from this list, one being chosen at random from each series. The first series contains about twenty-five questions on the line and plane; the second, thirty on the sphere, cone and cylinder of revolution, problems of angles, the solution of trihedral angles and regular polyhedrons; the third, thirty on cones, cylinders, pyramids and prisms; the fourth, twenty-two questions on surfaces of revolution; the fifth, twenty-five on ruled and helicoidal surfaces, and the sixth, twenty-five on shadows.

Twenty-two plates of about forty of these problems must be drawn and constitute part of the examination. The problems on the first six plates are to be chosen from the first two series, on the second six plates from series three, four and five, and the remaining ten on shadows.

One problem must be drawn "*en loge*," for which six hours is allowed. The problem given last year was: A cube stands with its diagonal vertical, a second cube of the same size has its diagonal coinciding with the first, but is turned through an angle of 22½°. Draw in plan and elevation the intersecting cubes and find the shadows at 45° on the solid and on the plane of projection. Pillet's text-book on "Descriptive Geometry" is closely followed in the lectures.

The course in stereotomy is also a thorough one and includes all of Pillet's text except the skew-arch. Under the division of masonry the lecturer treats of the methods and instruments used in stone-cutting, the principles of jointing, and of vaults, niches, domes and cupolas; the arranging and proportioning of treads of stairs, also vaulted and suspended stairs. Under the division of woodwork, the general rules of framing are considered, the methods of assembling pieces, general principles of roofs and the special ironwork of carpentry. This course also includes the methods of finding patterns of stonework and bevels of rafters, and two problems are given, the one in wood and the other in stone construction. Of those given last year the first was a small railway station which involved the design of the building, the framing plan of the roof and the principal bevels, also the framing of the stair and the patterns for the front string; the second was a building entirely in stone, to be erected in a public market square and to contain a fountain and other sources of water-supply for the market. It was to be a vaulted structure with the vaulting visible both inside and out, and a decorative motive based upon the structural form of the vaults. In the centre was to be a large stone basin and around the walls small basins supplied with both warm and cold water for washing purposes. Outside were to be troughs for the watering of animals. The basement was to be used for storerooms and was also to contain the apparatus for heating the water; a stone stairway was to serve as a means of communication with it. Drawings were required of the plan, façade and section, showing the jointing of the stonework, besides patterns of three *voussoirs*, one of which was to be from the vaulting of the stairway. A course in surveying, consisting of six or seven lectures and three days' practical field work, is appended to the above course.

The work in construction comprises twenty lectures on theoretical and thirty on technical construction. Brun's text on "Construction" is followed in outline, but in a condensed form, and the formulas which are given are demonstrated whenever possible by means of the mathematics already enumerated. The following outline is very general and the reader is expected to supply many headings which are necessarily preparatory to some of those enumerated. The lectures include internal and external forces acting on beams, application of formulas to all usual cases, beams of equal resistance, also beams subject to inclined pressures, columns, lattice girders, roofs, calculation of strains and deformations, curved roofs, metal ribbed vaults, expansion, friction, effect of wind, stability of masses and distribution of pressures, retaining-walls, problems of stability, applications to foundations in general, reservoir walls, stability of vaults and their supports, curve of the centre of pressure and its application to vaulting.

The technical part includes a description of the materials of construction, methods of handling and transporting them, foundations, rules for masonry work, walls subject to thrust, buttressing, shoeing, piers and columns. Vaults are treated first historically, after which follow descriptions of different kinds, methods of construction, centreings, piers, abutments and buttresses, stone stairs,

[1] A paper by James M. White, Assistant Professor of Architecture, at the University of Illinois, published in the *Technograph*.

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paving with flagstone, brick and asphalt, and the draining of rain-water. The lectures on wood-working include descriptions of woods, methods of preservation, general principles of wood-working, assemblages, walls, floors, scaffolding, roofs, dormers, spires, towers, effect of wind and snow, roof coverings, stairs, joinery and special ironwork. This is followed with lectures on metal work, descriptions of the useful metals, commercial shapes, iron walls and floors, masonry work of floors, roofs, trusses, arches, awnings, glazed roofs, water-pipes, gutters, iron blinds and shutters, elevators, grilles, balconies, hardware, plumbing and gas-fitting, heating and ventilating, electric-bells, and lightning conductors.

Three problems are worked *en loge* during the lectures on theory and three general problems are required during the latter part of the course. Besides these problems there is an oral examination on each of the two parts of the course of about three questions. The nature of the problem to be worked *en loge* is known beforehand, so the student may be supplied with whatever data and formulas that may be necessary. One of these problems called for the design of a lattice I-girder of equal resistance throughout and to sustain a uniformly distributed load and two concentrated loads at equal distances from the end. Given the size of the angle-irons, height of web, width and thickness of cover-plates and diameter of rivets. Calculate the number of cover-plates required at the centre and at what points they may be successively discontinued, also the spacing of the rivets for the cover-plates and the lattice bars. Another problem was the design of a six-panel triangular truss, sustaining dead load only, by both analytical and graphical methods.

The three required during the lectures on technical construction involve design as well as construction. The first usually includes the investigation of a vault, such as: Design a grand stairway leading up to a terrace, the principal landing of the stair being vaulted. Calculate the vault and its buttresses. The second in one case called for the design of one bay of a riding-school, the walls to be of half-timbered work, trusses 38 metres centres and 20 metres span. Submit plan, elevation, details of framing and the calculations of the principal parts. The third is called the general problem and includes about all the ordinary problems of construction which can be centred in one building. The following one will serve as a sample: Design a museum building, consisting of a central glass-covered court, surrounded by galleries, three stories and basement high. On the third floor is to be a library. The basement ceiling is to be vaulted, the other floors to be of iron and masonry, the roof of the court to be of iron and glass, while that of the galleries is to be of wood and metal. There are required complete general drawings, problems of the stability of the vaults and notes on the calculations. These drawings are quite elaborately worked out and rendered in color, even the construction details having the shadows all cast at 45°. The feature of design enters every problem that requires drawing, no matter what the study.

The course in perspective consists of twenty lectures and is very thorough. Three problems are required besides one *en loge*. The following may be considered as samples: Design a pedestal bearing a statue, the base to be about 1.5 metres across and either square or circular. Make a drawing of a public place, surrounded by arcades and with a monumental fountain in the centre. No side of the square is to be parallel to the picture plane.

Make a drawing from nature of an *ensemble* or architectural detail, the drawing to be at least 0.25 x 0.35 metres. The problem given to be drawn *en loge* last year was the capital, architrave and frieze of the Greek Doric Order without triglyphs. The shadows were also required.

The above is, I believe, a fair representation of the work of the school not classed under the head of design, except the diploma drawing, which is a thesis design and involves details of construction and specifications. A candidate for a diploma is also required to pass quite elementary examinations in physics, chemistry and building law.

The usual problems in design do not include any calculations of construction as no construction is expected to be shown on the drawings.

RECENT EGYPTIAN DISCOVERIES.

THE extraordinary popular interest evinced of late years in the history of ancient Egypt is evidently on the increase, writes Mr. L. E. Steele in the *Irish Times;* and the remarkable fact that no less than three distinct collections of objects from amongst the most recent "finds" in Egypt are, during part of this present month of July, on exhibition in London, is sufficient evidence that the avidity for information in this direction is stronger than ever. Egyptologists, most generous of *savants*, have always placed their marvellous collections at the service of the *dilettante* and of the expert alike, and taken immense pains to point the lessons of the diggings and discoveries; and so it comes to pass that there is now a widespread and intelligent appreciation amongst the ordinary reading public of facts, which, but a few years ago, were deemed to be the heritage alone of the high priests of the cult of hieroglyph, tomb and temple. The educated man who nowadays is unacquainted with the salient facts of the history of, let us say, the fourth and eighteenth dynasties of ancient Egypt, or who speaks of cartouche and cartonnage, of pylon and propylon, of stele or scarab, with the hesitation begotten of ignorance, is held to be but a sorry fellow, and worthy of the fate which Osiris suffered at the hands of his brother, Set.

However, the sciolist has not quite got it all his own way yet, for, from time to time, popular speculations as to the buildings and beliefs of the nation of mummies assume fantastic and amusing form. It has ever been so. From the times of the earliest writers, from Herodotus to Georgius Syncellus, the *ex Africa semper aliquid novi* has made the imagination of the unlearned run riot in theorising, and has supplied the expert with excellent opportunity for administering archæological castigation. For example, Strabo, in the early days of the Christian Era, is at great pains to demolish a popular notion prevalent in his day with regard to the pyramids at Gizeh. The great mass of these buildings is composed of huge blocks of limestone of various sizes, cut for the most part from the neighboring quarries of Turah, on the opposite Nile bank. Now this particular limestone, geologically speaking of comparatively recent formation, is mainly formed of masses of small fossils known as nummulites; they are in size and shape not unlike lentils. The weathering of these huge artificial mountains has caused considerable deposits of these little hard brown fossils to form at the bases of the buildings. Two thousand years ago these deposits were perceptible to the men of Strabo's day, and they conceived the strange theory that they were survivals of the great stores of food provided for the generations of workmen who for many a long year toiled for the great kings of the fourth dynasty. This popular fallacy the old Greek proceeds to confute, and correctly points out that the so-called lentils are but petrifactions, examples of which he was familiar with at his own home in Pontus. But the men of two thousand years ago need no apology when, at the end of the nineteenth century, there are found some who believe that the stones of the pyramids are merely blocks of concrete moulded as the old buildings required them, and as the building rose — an ingenious enough solution of the mechanical problem, if tenable. The absurdity of the theory will be apparent at a glance. The "concrete" of which they are built is a "concrete" which, as far as is known, stretches right across the northern part of Africa, which pushes its way five hundred miles up the Nile Valley until it meets with the sandstone and syenite at Assouan, and of whose thickness the gods alone know the measurements. If we are to believe that the old Egyptian made his concrete blocks as the modern jerry-builder does, we must also be prepared to admit that he laid down this vast limestone floor of North Africa as the modern workman lays down his concrete footpath. But the concrete of Egypt is no work of man's hands, but the result of one of the infinitely slow processes of Nature's alchemy. Out of this limestone, of hoary antiquity when compared with the paltry four thousand years of Egyptian rule, the men of the land built many of their grandest edifices, and into this rock they hewed their way to find a resting-place for their honored dead.

It may be interesting for us to know the nature of these London exhibitions of objects from Egypt; at least, of two of the most attractive, as some may had an opportunity of visiting them during last month.

The Egyptian Exploration Fund has been carrying on a work of paramount importance for the past three winters in the neighborhood of Thebes. M. Naville, with Mr. Newberry and other devoted explorers, have succeeded in almost completely clearing one of the most exquisite and interesting of the temples, relieving the precious edifice of a heavy superimposed mass of rubbish, in some places no less than forty feet in thickness. They have revealed in its main features, for the first time in modern days, a temple which stands unique amongst the buildings of ancient Egypt for originality of design and beauty of workmanship; and one of these exhibitions contains a remarkable selection of portable objects which have been recovered in the course of the excavations. We need not concern ourselves now with the details of the exhibition, but rather try and gain some broad facts in connection with the architecture and chronology of this building, which will enable us to appreciate the importance of M. Naville's undertaking.

Right opposite to the stupendous ruins of the Temple of Amon, at Karnak, with the River Nile between them, stands, most curiously situated, this Temple of Dêr-el-Bahri. At this point, the great gaunt limestone cliffs of the old river-bank fold back into the Western Desert, and form an almost right-angled crease. At the base of the scar, and dove-tailed into a corner of the rock, the architect has planted the temple. At the upper or sanctuary end, and along the right side, the protecting cliff rises sheer from the platform and embraces the walls of the building, and also, be it said, has proved a source of enormous trouble to the explorers from the deposit which the weathering of centuries has rolled down from its sides upon the temple platform.

Now, if we imagine that the platforms and the buildings which the explorers have exposed form the temple proper, we shall be quite in error, and herein lies the feature which stamps this building as unique amongst the sacred edifices of the land. The temples of Egypt were either great independent erections, standing freely upon the plains, or gigantic caverns hewn into the cliff side. The temple of Dêr-el-Bahri is a combination of both. The great platforms, no less than three in number, rising like three gigantic steps, one higher than the other, are merely the approach to the temple. The holy of holies, the sanctuary of Amon, to which great god of Thebes the building is dedicated, lies in the cliff side, and for no less than sixty feet the visitor penetrates the solid rock to examine its features.

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And besides this temple there are many minor rock-hewn halls and shrines, to which he will find entrance from the platforms. The building is, in truth, a transition one. The architect has taken his idea of the sanctuary from the tombs in the hill-side, especially those at Beni-Hassan, and suggestions for the platforms from the temples of his predecessors, combining them with consummate skill and taste. It forms, in style and in time, a link between the pile at Karnak and the gigantic rock-cut temple of Aboe-Simbel, which Rameses II, two hundred years later, carried for three hundred feet, the length of St. Patrick's Cathedral, into the cliff's side.

High up in the face of the precipice, the architect of Dêr-el-Bahri has hewn his temple and shrines, and the height at which he has placed them has suggested to him the conception of bringing the worshipper up from the level of the plain beneath by a succession of platforms, the first two of which are some 250 feet long and 300 feet wide. The "step" from platform to platform was too lofty to scale directly, and so the approach of the worshipper was facilitated by sloping ways, springing from the centre of each platform to the level of the one above it. The faces of these steps have been utilized for inscriptions and historic pictures, and, as we shall presently see, one of their surfaces records, with full illustrations, an incident of the time which has for us just now some points of special interest.

To whom do we owe this lovely temple? Who was its architect? When was it built? The excavations of the last three winters have given complete and satisfactory answers to the questions. Its erection was due to the munificence of Queen Hatasu, or, as she is otherwise called, Queen Ramaka, wife to Thothmes II, and aunt to Thothmes III, one of whose obelisks is a familiar object on the Thames Embankment. We are all now familiar with the idiosyncrasy of this great Queen. The pictures in her temple invariably represent her dressed as a man, while the inscriptions speak loud in praise of her as a woman. After all, she did no worse than Joan of Arc, and thus anticipated by some thirty-five hundred years the aspirations of the rational dressers and lady bicyclists of our own day.

And the architect? Who was this ecclesiastical artist — this Wren of ancient Egypt? We now know much about him. A statue of him is in Berlin, and his name was Senmut. Thus he speaks of himself in the inscription on the statue in words which curiously illustrate the trouble taken by the officials to combine the actual and assumed sex of their kingly queen: "I was a great man who loved his *lord*, and I gained the favour of my *queen*. *He* exalted me before the face of the land to the rank of overseer of *his* house and purveyor of the land. I was chief over the chiefs, head of the architects; I executed *his* orders in the land. I lived under the lady of the land, Queen Ramaka living eternally." And thus some fifteen hundred years before Christ, and two hundred years before the Hebrews fled from the land, Queen Hatasu and her architect, Senmut, planned and built this lovely temple. One word about the famous sculptures on the face of the step to the upper platform. A considerable portion of this wall-surface of almost three hundred feet is occupied with pictorial representations of a commercial expedition dispatched by the Queen to a land spoken of as Punt. Five ships comprised the expedition, and they returned laden with products, such as gold, ivory and incense; with animals, such as leopards, panthers, dogs, monkeys and giraffes; and with aromatic trees, which we see at first in flower-pots, and, after their transplanting, flourishing in the soil of Egypt — commodities which point undoubtedly to an African locality; and, indeed, there is excellent ground for supposing that Punt was no other than the coast of Africa, at the lower end of the Red Sea, and now known as the Somali country. Is it more than imagination that would see in that extraordinary Somali encampment in the grounds of the Crystal Palace the direct descendants of those men of Punt with whom the sailors of Queen Hatasu traded thirty-five hundred years ago? It is an idea worth considering as we run down to the palace after a visit to the Dêr-el-Bahri relics at Burlington House.

But the collection which transcends, in sensational interest at all events, is that which Professor Petrie and Mr. Quibell have thrown open at University College to all interested in this fascinating subject. Here we have brought home to our very door evidence of the astounding discovery made by Professor Petrie last winter, that in a district, extending for some hundred miles south of Abydos, there lived, three thousand years before the Christian Era, and contemporaneously with the Egyptians, a race of men wholly unlike the people of the land in their customs and their arts, ethnologically wholly unrelated to them, and, so far as is yet known, wholly unlike any race of antiquity. And the discovery has thrown a curious light on a passage in Juvenal. That author, in his fierce denunciations of Egyptian ways in the Fifteenth Satire, relates how that there were two towns, Ombos and Tentyra, between whose inhabitants in his day there was "a long-standing feud of remote origin," and tells how on one occasion, when the people of one town were holding high festival, they were attacked by the inhabitants of the other, and how, when the defeated Tentyrites fled, the Ombites paused, like a pack of wolves, in the pursuit to devour the body of a slain Tentyrite and pick his bones (*corrosis ossibus edit*). Now, Tentyra is the modern Denderah, some forty miles north of Thebes, but Ombos (in ancient Egyptian times called Nubt) has heretofore been identified with the well-known Kum Ombo, which place, unfortunately for the coherency of Juvenal's story, is situated one hundred and twenty miles, as the crow flies, south of Tentyra, and on the opposite bank of the river.

They could not, therefore, have been considered "neighbors," as Juvenal asserts they were. Professor Petrie has set the question at rest for ever, for he has found and explored the ruins of a town quite close to Tentyra, which he has also discovered to have borne the name of Nubt, and, therefore, of Ombos. Moreover, he has explained the statement of Juvenal that "the cause of the feud was chiefly that each place disliked its neighbor's religion," by the discovery of undoubted evidence that the town was a centre of the worship of the hateful god of evil, Set, who, according to the legend, had destroyed his brother, Osiris, and to which cult the orthodox Egyptian was bitterly opposed; hence the hostility of the Tentyrites.

Now we must bear in mind that these two towns were distinctly Egyptian, and the evidence adduced by Professor Petrie from the remains unearthed on this new site proves the thoroughly national character of the art and architecture of the town. But within a quarter of a mile of this newly-discovered Ombos or Nubt, another town, with a great associated cemetery, was laid bare, which proved to be as un-Egyptian in its character as the other was Egyptian. Neither in the town nor in the cemetery was there found a single article bearing any comparison with the relics of the Egyptian town. To quote the words of Professor Petrie, "Not one scarab or cartouche, not one hieroglyph, not one piece of usual funeral furniture, a head-rest or a kohl-pot, not one Egyptian bead, not one god, not one amulet, not a single piece of Egyptian pottery," was discovered within the precincts of this strange settlement. It was evidently the centre of a powerful foreign colony. Although no trace was found to indicate a knowledge of the art of writing, the fine arts generally, with the exceptions of drawing and sculpture, which were crude, were found to be quite on a par with those of the Egyptians, and, in some respects, excelled theirs. The discovery of copper adzes point to woodwork, copper needles to the fact that sewn garments were worn; in flint implements, these mysterious people surpassed the Egyptians, and of pottery and glasswork no finer specimens have been found throughout the land. Professor Petrie assures us that the stone vases, of beautiful form, were made entirely by hand, with a lathe, and that the gracefully moulded clay vases were formed without the assistance of the potter's wheel.

But the sensational discovery lay in the cemetery. No less than two thousand graves were opened by the explorers, and their contents examined with surprising result. It was found that this early man, a tall, long-legged, long-bearded, eagle-nosed human being, did not mummify his dead, as his neighbors did, nor bury them stretched at full length, but, as Andrew Lang sings, entombed them

> With their toes
> Tucked up, an original plan,
> Till their knees came right under their nose,

and in a sitting posture, with the head to the south, but the face to the west. This was, however, the case only in the minority of instances. A far more extraordinary revelation awaited the explorers in the majority of graves examined. In these, the bodies had been cut up into pieces, and the bones grouped and arranged with evident design — ribs in one place, arm-bones in another and the skull, in many cases, placed between two vases. Most curious of all, there was evidence in this condition of the remains, as well as in the fact that the bones had been broken off short and the marrow scooped out, that amongst this primitive people there prevailed the horrible custom of cannibalism, which, in some way, was connected with their funeral and possibly with their religious ceremonies. It was a gruesome discovery, but one of intense interest. It is dangerous to speculate in the face of the warnings of Egyptologists, but one cannot help thinking that those Ombites, of Juvenal's time, who devoured the slain Tentyrite, were acting in accordance with an ancient custom which their remote ancestors had adopted from these mysterious foreign settlers, and handed down through three thousand years.

All exploration work in Egypt ceases with the approach of summer, and so we must wait patiently until another spring brings back Professor Petrie again, laden with the spoils of that land, which seems to yield its treasures and its history to this Egyptian magician with miraculous facility. Meantime, this brief account of the results of last winter's campaign may prove helpful in enabling us to appreciate the lessons of the exhibitions at Burlington House and University College. — *The Architect.*

BOOKS AND PAPERS

MR. MARSHALL'S book[1] is really remarkable. It is rare to find the evidences of so wide a knowledge brought to the treatment of this subject; and rarer still to find such attainment used in so philosophical and open-minded a spirit. Each re-reading of the little volume removes earlier misconceptions and objections, until a feeling little short of unqualified admiration remains. The author's logical development of his theme, his wide range of intellectual sympathies, his fairness of judgment and his impersonality

[1] "*Aesthetic Principles*": by Henry Rutgers Marshall, M. A., author of "*Pain, Pleasure and Æsthetics.*" Published by Macmillian & Co., London and New York. For sale by W. B. Clark & Co., Boston; $1.25.

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and modesty of style—all these are elements fighting on his side, inclining the reader to a sympathetic appreciation of his views.

Mr. Marshall bases his theory of æsthetics upon the phenomena of the mind rather than upon the phenomena of the external world of art. That is to say, his point of view is the psychologist's. His hypothesis is, that "the science of æsthetics is fundamentally a branch of the science of pleasure." In the development of this hypothesis, the reader is led to consider very briefly the inadequacy of previous systems of æsthetics, and is given a succinct idea of the nature of pain and pleasure, from a psychological point-of-view. Aesthetic pleasures, Mr. Marshall then proceeds to show, are distinguished from all other pleasures by one constant trait — namely, their relative *permanency*. By pleasure, the author means that totality of agreeable impression that results from any given experience, and which can only be estimated by the mind when the impressions resulting from other experiences are re-called and compared with them. Those which longest remain agreeable in this retrospective view, Mr. Marshall identifies as the æsthetic pleasures. The demonstration of this is very pretty. All primary sensative pleasures are dependent for their intensity and duration upon physiological conditions, and rise and ebb with the natural demand of the organs which are their agents. It is impossible, therefore, that any one particular pleasure should be, in point-of-fact, a permanent and uninterrupted one; but to the mind reviewing it in memory, it will appear as a yet unexhausted and so *relatively* permanent pleasure, provided attention has been diverted from it before weariness ensues. The function of the æsthetic faculty is, then, to combine the various agencies of pleasure-giving in such way that no one claims attention to the point when attention becomes weariness, but each contributes in some measure to the value of all the rest. Thus, out of various pleasures, of themselves short-lived, is produced a group, or *pleasure-field* as it is called, which can be enjoyed during a considerable interval of time. In proportion as the combination effected retains its power of pleasing, does it take rank as an æsthetic production.

It is plain to see that in the above theory Mr. Marshall has described with justice mental conditions which might have been familiar had we but been observant enough to notice them. His theory is at once justified by common experience. Of course, the work of art is that which longest keeps its hold upon our affections, and the greatest are those which "endure to the end." The justice of his delineation in the large seems so obvious that it would hardly appear as worthy of more than a passing consideration, if it were not for the train of lesser, but more applicable conclusions which follow from it.

Perhaps the most important of all the results of the above classification of æsthetics is that, according to it, no resultant of human activity, or even any unsought effect of Nature, is excluded from the possibility of producing æsthetic effects upon the observer. No arbitrary line is drawn which must be enforced by dogma and defended by controversy. That which appears to any one as beauty is to him, for the time being, an æsthetic agent. Each person, therefore, is privileged to determine his own standard of æsthetic values. There are as many standards of what is beautiful as there are persons to hold those standards, a fact equally true of morals. From the constant clashing and comparison of these standards is evolved the fine appreciation which belongs only to the most highly cultivated of men.

Mr. Marshall lays great stress upon what he calls this "Relative Standard," partly because it seems to correspond with the actual facts as we see them commonly, and partly because it offers a premium to self-culture, and prevents an ever-enlarging field of delight to the advance of the race.

Another important conclusion is that to which the author is brought regarding the precepts which we have been accustomed to hear from youth, such as "seek truth," "get repose," "unity" and the like. He finds, as a consequence of his examination, that from a strictly æsthetic standpoint these should rather read, "avoid the appearance of untruth, instability, disruption," etc. From the *æsthetic* standpoint — for other considerations have their own point-of-view — the conscious effort must be negative rather than positive. It is not that truth is beautiful *per se*, for a factory may be as truthful as you please, yet not beautiful. It is not truth that adds, but the appearance of untruth that detracts. Repose is not beautiful in itself, but restlessness is unbeautiful; and so on.

This is a very fine discrimination, whose possible range of effect upon all theories of artistic procedures and criticism may not be at once perceived; but it is destined to excite the animadversion of the literary realists, at least, and, in our opinion, to go much farther. It certainly casts a light upon the nature of our feelings when we have come to find a building which we have always admired for its beauty to be in many respects a structural sham. We are conscious of a loss of regard for it; but this view of Mr. Marshall's would show that the nature of our disillusionment was moral rather than æsthetic. Our æsthetic appreciation suffers along with our moral appreciation; but it is the moral shock which has wrought the mischief, and that alone.

It is impossible to here further suggest the contents of this most able research into the underlying principles of æsthetics, as interpreted by psychology. Mr. Marshall's book is indispensable to all who profess to teach the theory of art. It is not a trifle to be absorbed at a single sitting, or a single reading. It must be patiently mastered, for it requires close thinking and a free mind. It is not a book of recipes for making art, and presents slight attractions for indolent minds. It is, rather, formative in its character, and will be welcomed by those who love to think seriously of art, whatever may be their predilections regarding existing theories.

Mr. Marshall's work yet leaves much to be said regarding the function and service of art; and his book will doubtless prove a stimulus to those who would have "pleasure" defined in larger terms than purely subjective ones. Perhaps the author will himself undertake this task?

Hubert Robert,[1] to whom is devoted a rather too bulky volume, by M. C. Gabillot, the last one issued in the "*Les Artistes Célèbres*" Library, was an eighteenth-century French painter and engraver. He spent some years of his early life in Rome in drawing the remains of its ancient architecture, and after his return to Paris was made a member of the Academy and was much employed by royalty as a landscape architect, the grotto of the Bath of Apollo, at Versailles, being from his design. During the Revolution, Robert was deprived of his position and thrown into prison (where he worked at his art, when possible, with unrestrainable ardor) but was so fortunate as to escape the guillotine through a mistake of the jailer, who sent to the knife another prisoner of the same name instead of our artist, who lived to round out three-quarters of a century of an eventful and busy life.

His great industry and ability as a painter of architectural subjects are attested by the contents of M. Gabillot's monograph, which is well illustrated, not only with specimens of Robert's talent, but with numerous portraits of his friends and contemporaries, who included many notable people. The book is certainly of much interest, but viewed as an artist, Hubert Robert cannot be held to deserve so much more space than some of the greatest names in art have been granted in this series.

Professor Pierre Paris, the author of "*La Sculpture Antique*," has written the volume on Polycletus,[2] which is one of the latest to appear in the series of "*Les Artistes Célèbres*."

This noted Greek sculptor, the friend and fellow-pupil of Phidias, made the great chryselephantine statue of Juno for her temple at Argos, the site of which our American School of Archæology has excavated with important results. The most famous of his smaller works, of which we can form a better idea than of the Juno by the copies of them which remain, were two athletes known respectively as the Doryphoros and the Diadumenos, and an Amazon, the latter being preferred over the competitive model prepared by Phidias for the Temple of Diana at Ephesus. A sculptor rather of men (especially of strong men) than of gods, Polycletus wrote a celebrated treatise upon the structure of the human figure, and was also an architect, the theatre at Epidaurus designed by him, being, according to Pausanias, the most beautiful in the world. Of all this and more, Professor Paris writes learnedly in the book before us, which is illustrated with cuts showing the chief productions of Polycletus.



TWENTY-NINTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE Twenty-ninth Annual Convention of the American Institute of Architects is to be held at St. Louis, on Tuesday, Wednesday and Thursday, October 15, 16 and 17, 1895, with headquarters at the St. Nicholas Hotel.

There will be a session on the forenoon of each day, followed by a lunch at the hotel as guests of the St. Louis Chapter.

On Tuesday evening there will be a formal reception at the Museum of Fine Arts as guests of the St. Louis Architectural Club, and an address of welcome by the Mayor of the city. On the afternoon of Wednesday there will be a carriage drive through the residence portion of the city and the parks, and a luncheon at the Columbian Club or an excursion on the river. On Thursday afternoon, the Institute will visit the Anheuser-Busch Brewery, or prominent buildings completed or in course of erection, and in the evening will attend the theatre or Exposition.

The Committee has arranged for rooms at the St. Nicholas Hotel — without bath, for from $1.50 to $2.00 per day for each person, and with bath, from $2.50 to $4.00 per day for each person, according to location; double rooms for two, with bath, $1.50 to $2.00 extra.

The Institute has never met as far west as St. Louis, and the Chapter has made a special effort to prepare to entertain its guests. It is, therefore, hoped that you will be present, and that you will extend an invitation to any practising architects of your acquaintance, not members of the Institute, to attend its meetings.

If persons who propose to attend the Convention from Philadelphia, New York or Boston and the intermediate cities and towns,

[1] "*Hubert Robert et son temps*," *par C. Gabillot.* Paris: *Librairie de l'Art.* 1895.

[2] "*Polyclete*," *par Pierre Paris.* Paris: *Librairie de l'Art*, 1895.

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will notify the Secretary before the 28th day of September, he will, if enough desire it, endeavor to obtain a special through car by a route which will accommodate the largest number and at the minimum cost.

Committee of arrangements:

GEORGE B. POST, CASS GILBERT, W. W. CLAY, *From the A. I. A.*

A. F. ROSENHEIM, CHARLES K. RAMSEY, THOMAS C. YOUNG, W. B. ITTNER, E. A. MANNY, *From the St. Louis Chapter.*

Per Order of the Committee,
ALFRED STONE, *Secretary, A. I. A.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

DINING-ROOM: MONTAUK CLUB-HOUSE, BROOKLYN, N. Y. MR. F. H. KIMBALL, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print issued with the International and Imperial Editions only.]

TWO DOORWAYS AT NEWPORT, R. I. MEASURED AND DRAWN BY MR. P. G. GULBRANSON, ARCHITECT, BOSTON, MASS.

DETAILS OF THE WATSON HOUSE, NEWPORT, R. I.: THREE PLATES. MEASURED AND DRAWN BY MR. P. G. GULBRANSON, ARCHITECT, BOSTON, MASS.

SECTIONS AND CEILING OF THE SHEPARD MEMORIAL CHURCH, SCARBOROUGH HEIGHTS, N. Y. MESSRS. HAYDEL & SHEPARD, ARCHITECTS, NEW YORK, N. Y.

THE ceiling is executed in California red-wood.

[Additional Illustrations in the International Edition.]

ENTRANCE-HALL: MONTAUK CLUB-HOUSE, BROOKLYN, N. Y. MR. F. H. KIMBALL, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print.]

A REAR view of this building was published in the *American Architect* for April 22, 1893.

READING-ROOM OF THE SAME.

[Gelatine Print.]

SMOKING-ROOM OF THE SAME.

[Gelatine Print.]

BILLIARD-ROOM OF THE SAME.

[Gelatine Print.]

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

DANGEROUS STATE OF SALISBURY TOWER.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— In connection with the article on the above subject that appeared in this journal under date August 24, 1895, it will not be uninteresting to refer to the work carried out under the direction and supervision of Sir Gilbert Scott, who was appointed, as he says in his "*Recollections*," "about 1859." He says: "Our next great work was the strengthening of the tower. The original thirteenth-century builders had erected a central tower, rising sufficiently high to receive the roofs of the four arms of the church. The story against which these roofs abutted is a very light structure, and was intended to be visible from within. It is perforated in its thickness by a triforium gallery, leaving externally, a wall of little more than two feet in thickness, while the interior consists of a light arcade with Purbeck marble shafts. The corner turrets have each a staircase, rendering them mere shells.

"On this frail structure the fourteenth-century builders carried up the vast tower some eighty feet high, with walls nearly six feet thick, and upon this, a spire rising 180 feet more. It need not then be wondered that the older story, so unduly loaded, should have become shattered. Subsequent builders have bolstered it up by flying-buttresses, and by every form of prop they could invent, till the sectional area of the added supports exceeded that of the original structure. Still, however, the crushing went on, and when I examined it, it had proceeded to very alarming lengths. I proposed to bond it together (in addition to the numerous ties it already had) by diagonal iron ties, and then gradually to insert new stones, in place of those which were shattered.

"The Chapter, for further satisfaction, called in the aid of an engineer, eminent for iron construction, Mr. Shields, whose opinion very much coincided with my own. To him was confided the arrangement and construction of the ironwork, which was admirably carried out under his direction by Messrs. James, of London. It consisted mainly of two heights of diagonal ties, branching out towards their ends and passing round the stair-turrets, and so grasping them firmly, through a height of several feet, in which space they are connected by vertical irons placed upon the exterior faces. When this system of ties was once firmly fixed, I felt that we could safely proceed with the reparation of the stonework. This was carried out under the direction of my excellent superintendent, Mr. Hutchins. Nearly all the steps of the four staircases were shattered, and had to be taken out and renewed and the same was the case of a very great amount of the stonework. This was effected almost stone by stone, so that small parts were only disturbed at once — a very lengthy process, but the only safe one. It spread over many months, till at last every crushed stone had been replaced by one stronger than the old one had ever been, and set firmly in cement, so that by the time we had done, the work was stronger than it had been when new.

"Reparations of a minor kind were effected throughout the tower and even to the top of the spire, where I had the satisfaction of inspecting them up to the very vane.

"We dare not do anything to the bent piers which carry the tower. Their curvature seems to have arisen from two causes, first, from the pressure of the arcades upon their flanks, and secondly, from their backs or flanks not consisting, as do their fronts, of Purbeck marble closely bedded, but of compressible rubble walling. These two causes acting together would almost necessarily produce flexure. This had been remedied in the north and south arches at an early date, by building arches across them at, say, half height. The same might have been effected by a stone screen in the eastern arch, but in the western it would produce an inconvenient obstruction. I have advised the authorities to keep a watch over the piers, and if any increased curvature should be observed, to take some precaution, such as the insertion of iron beams from pillar to pillar."

From the above quotation, it would appear that Sir Gilbert Scott and Mr. Shields thought that their method of "tying in" the corner stair-turrets would be a sufficient and lasting work of reparation. Sir Arthur Blomfield does not say whether these ties and external bands are causes of injury through rust, and Sir Gilbert Scott does not allude to "the numerous small rods, bands and plates which," says Sir A. Blomfield, "I believe to have been introduced in the upper parts of the angle turrets in the time of Bishop Sherlock." It is evident from the recent investigation that the work of reparation of about thirty-five years ago has to be supplemented to a very great extent by costly works at the present time, due chiefly to the thrust of the spire, and it will be very instructing to see what improvement science will now suggest upon the methods of thirty-five years ago. The immense strides taken during that time, in methods of construction, will probably result in strengthening once and for all the weak places and in giving an abutment to the thrust which will be sufficient for all time, but it may be surmised that Sir Gilbert Scott, whose experience in works of reparation of great magnitude and unusual difficulties was extensive, would be very much surprised to find that further repairs are required now. It is at all events to be hoped that such works as are executed now will not be found by the next generation to need further supplementing.

R. W. G. B.

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

NEW YORK, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

Water-colors of American Yachts: at F. Keppel & Co.'s Galleries, 20 East 16th St., September 6 to 17.

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NOTES AND CLIPPINGS

The Danger to Salisbury Cathedral.—The Salisbury *Journal*, writing with reference to Sir Arthur Blomfield's report on the danger to the spire of Salisbury Cathedral, says: As originally reared, the Cathedral of New Sarum was destitute of this crowning grace. Added by a bold afterthought on the part of some great architect of the fourteenth century, whose name is lost, Salisbury spire has now continued to lift itself towards the heavens for half a thousand years. But Salisbury spire, though one of the most graceful fabrics that the hand of man ever wrought, is also one of the most daring. The sub-structure on which the spire and the upper part of the tower rest was not intended by the original builders to bear such a burden — gigantic as glorious. We need hardly remind our readers that the early English cathedral church of which Bishop Richard Poore laid the foundations in 1220 included only the lower part of the central tower, originally constructed as a lantern. A hundred years later — in the reign of Edward III, and while Wyvil was Bishop of Salisbury, it was the good fortune of the cathedral to be crowned with its noble spire by some unknown architect. With the insight of true genius, he grasped the opportunity transmitted to him by his thirteenth-century predecessors, and carrying the tower to a greater height, ventured to place on it the lofty spire. But, like some other men of genius, in taking advantage of the means afforded him for a display of his powers, he tried those means to the utmost. While he bequeathed the spire of Salisbury to succeeding ages as an object of reverent wonder, he also made it a treasure which was only to be preserved by the exertion of exceptional vigilance. That vigilance has, on the whole, been displayed; but as Sir Arthur Blomfield's report shows, it has not always been well directed. The numerous iron bands, rods and ties which have been introduced from time to time, with the object of strengthening the fabric, have often done more harm than good; the destructive agencies of wet and frost have been at work from year to year and from century to century; and the tremendous thrust of the spire has never ceased its pressure, which is both downward and outward. This last element of danger cannot be removed or even lessened; but hitherto it has been encountered by a resistance that was strong enough to prevent a catastrophe. No doubt the genius who reared the spire to its splendid height counted on that resistance being watchfully maintained; but the alarming discovery has now been made of a decay — apparently unsuspected until very recently — which has already become so threatening that, unless the damaged portions of the fabric are promptly and effectually repaired, the day may not be far distant when the ceaseless attack of time will prevail at Salisbury, and the beautiful spire of our cathedral will share the fate of other lofty spires and towers that have been laid in ruins. — *St. James's Gazette.*

Experiments on Wind-pressure. — The subject of wind-pressure is one on which our knowledge at the present day is not only limited, but exceedingly vague, and carefully made experiments, if but to investigate a single feature of the problem, are, therefore, of the greatest interest, and can hardly fail to add something new to our information. Mr. J. Irminger, C. E., Member of the Danish Society of Engineers, has determined, what it is believed no one before him has attempted to do, the amount of suction produced by a current of air striking a plane surface, or the surfaces of various bodies; and the results of his experiments form the subject of a paper with the above title, read before that Society in the early part of last summer. These results are remarkable in showing how very large a percentage of the total effect this suction is, not only through its action on the leeward side, but on the windward as well. In fact, when the angle at which the wind strikes a plane surface is small, nothing but suction is produced. The practical importance of these experiments is evident; they throw considerable light on the subject of flight, which at present is engaging so much attention; and in structural designing they point out the way to more rational methods. We have hitherto considered the resultant of the pressure only, but if that of the suction is also taken into account, the final resultant is changed both in amount and direction. Thus in the case of a roof, given below, the resultant of suction and pressure will tend to lift, and not overturn it, which is in accordance with experience. . . . Models were also experimented with representing buildings with roofs of various forms, and diagrams are given showing the distribution of pressure over leeward and windward sides. In all cases rarefaction on the side is quite as important a factor in the actual resultant force on the building as is the positive pressure on the windward side. The case of the pitched roof making angles of 45° with the horizontal on which a horizontal wind acts at right angles to the ridge is particularly worthy of note, and furnishes some food for thought. The normal pressure on the lee side due to suction is more than three times as great as that on the weather side. The resultant pressure on the two faces (neglecting the walls of the building) is inclined upward, and is about three and one-half times as great as that on the weather side. On the weather side the pressure is greatest near the lower edge, diminishes uniformly, and becomes a suction near the ridge. — *Proceedings of the U. S. Naval Institute.*

Earthquake Shocks in New York. — Apropos of the slight earthquake shock that affected New York City on September 1, the *Times* of that city publishes the following data concerning earlier shocks which have been felt there. Manhattan Island has been singularly free from the effects of earthquakes, probably owing to the sandy nature of its foundation. The last serious shock was felt by New Yorkers in March, 1893, about half an hour after midnight. On that occasion houses were shaken to their foundations, people were awakened from sleep, and the animals in the Central Park menagerie howled with terror. The disturbance was most felt in the neighborhood of Seventieth Street. The old clock on the Central Park Arsenal stopped and the Park policemen asked each other what was the matter. In the upper part of the tenement-house district on the east side crockery rolled off the shelves and a number of windows were broken. The general effect was that of a heavy explosion. Another slight subterranean disturbance was felt in Jersey City the following morning, and another shook houses in Brooklyn, frightening people into the streets. This shock was felt all over Long Island, and the water-supply of Flushing was stopped for several hours. When the water again filled the pipes, it was found to be muddy as though effected by some subterranean convulsion. Another shock was felt as far back as 1884, and still another in the latter part of 1891. The latter shook the Fifth Avenue Hotel, the foundations of which, as is well known, rest on a bed of solid rock, and the earthquake was the subject of jocular comment in a gathering of Republican politicians which just at that time happened to be assembled in the hotel.

Wind-pressure in India. — At the present juncture, when long established notions of wind-pressure are being severely questioned, the following rule issued by the Public Works Department of India is of interest: — The amount of wind-pressure on a railway bridge is to be calculated on the assumption, that the maximum normal pressure may be 1½ tons per 100 sq. ft. of surface exposed. The surface exposed to be reckoned as follows: — A train surface calculated on a height of 13 feet 6 inches on 5-foot 6-inch gauge, or 11 feet on the metre gauge, multiplied by the total length of the girder. The actual surface of that portion of one girder which may be below rail-level, or at a height above rail-level of more than 13 feet 6 inches on the 5-foot 6-inch gauge or 11 feet on the metre gauge. Also, in the case of triangulated girders, the actual vertical surface of that portion of the leeward girder which may be below rail-level, or at a height above rail-level of more than 13 feet 6 inches on the 5-foot 6-inch gauge, or 11 feet on the metre gauge. The total wind-pressure thus calculated is to be provided for by a proper system of wind-bracing, or floor-plating, and its effects taken into account as forming a part of stress on the chords of the main girders. Proper arrangements must also be made at the girder ends to secure sufficient stiffness to resist racking action where diagonal stiffeners are not used. Wind-pressure is to be treated as "fixed load," and its effect on the different members of the structure is to be allowed for as provided in the rule for "maximum permissible stress." — *Building and Engineering Journal.*

Red-tape in French Administration. — Since the success of the play of "M. le Directeur," a satire on the French Circumlocution Office, the subject of red-tapeism has been much discussed in Paris. M. Paule Bourde, a high official in Tunis, declares that when he first obtained an appointment under the Government, he was astounded at the amount of useless trouble taken to put obstacles in every one's way. He remembers that on the occasion of the Centennial Exhibition of French Art, permission was given to an artist to take a cast from Barye's famous lion in the Tuileries Garden. But directly the artist set to work the Public Works Department ordered him to desist. The fact had been overlooked that, while the statue belonged to the Ministry of Fine Arts, the plinth was the property of the Ministry of Public Works. Letters were written, an inquiry was made, and the necessary permission was obtained only after a lapse of six months. Another writer cites a recent case of a subordinate official who asked his chief for a holiday. "You must write a formal request," said the chief. "But I thought," said the subordinate, "that as I was able to to see you personally, it was not necessary to write." However, he was told that it was necessary, but that he might take a pen and write the letter then and there. When this was done his chief said: "You may go now. You will in due course receive my reply, by which I shall have to inform you that it is not possible for me to do as you wish." — *London Daily News.*

Why Emperors avoid Mayence. — Our Berlin correspondent telegraphs: At the last review at Mayence, the Emperor is reported to have said to the officers: "Do not forget that we must be strong in order to maintain peace, and that the stronger we are, the more respect will others have for us." It has been remarked that the Emperor has not entered the town of Mayence itself, although he has been repeatedly, and even this week, close to it. A local newspaper tells the following story in explanation: On a wall of Mayence Cathedral there is a sculptured hand, which is raised as if in the act of taking an oath. When the Emperor Francis of Austria was still German Emperor, he visited Mayence, and was so hospitably received by the clergy that he solemnly promised, and took an oath, that that German Emperor who from that day came first to Mayence and spent the night there, must pay for the building of the two towers on the cathedral. As a sign of the promise the hand was carved in the stone. "And no Emperor has spent the night there since that time," said the old man who is represented as telling the story, "and you will see that the present Emperor will not stay here any more than his grandfather did." — *London Daily News.*

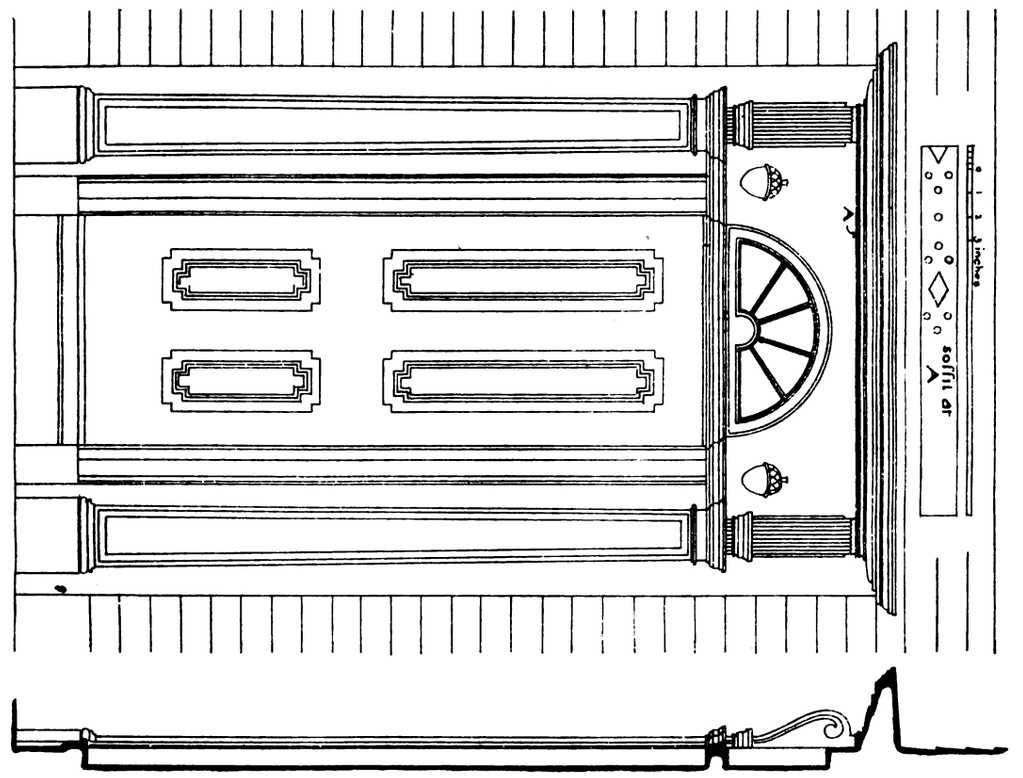
A strayed Canova Monument. — Canova, in 1812, made a monument for a Polish family, in Warsaw, representing a soul floating from heaven. It was sent from Italy, but when it reached Vienna the war made the country so unsafe that the monument was placed temporarily in the parish church of Penzing, just out of Vienna, where it has remained ever since. Recently the family for which it was made asked for it, when the parish priest refused to give it up unless he was paid $1,000 for more than eighty years' storage. The matter was referred to the Government authorities, and by them to the Commission for the Preservation of Artistic and Historical Monuments, which has decided that the priest was not justified in his demand, but that giving up the monument would be an artistic loss to Vienna. — *Cincinnati Commercial-Gazette.*

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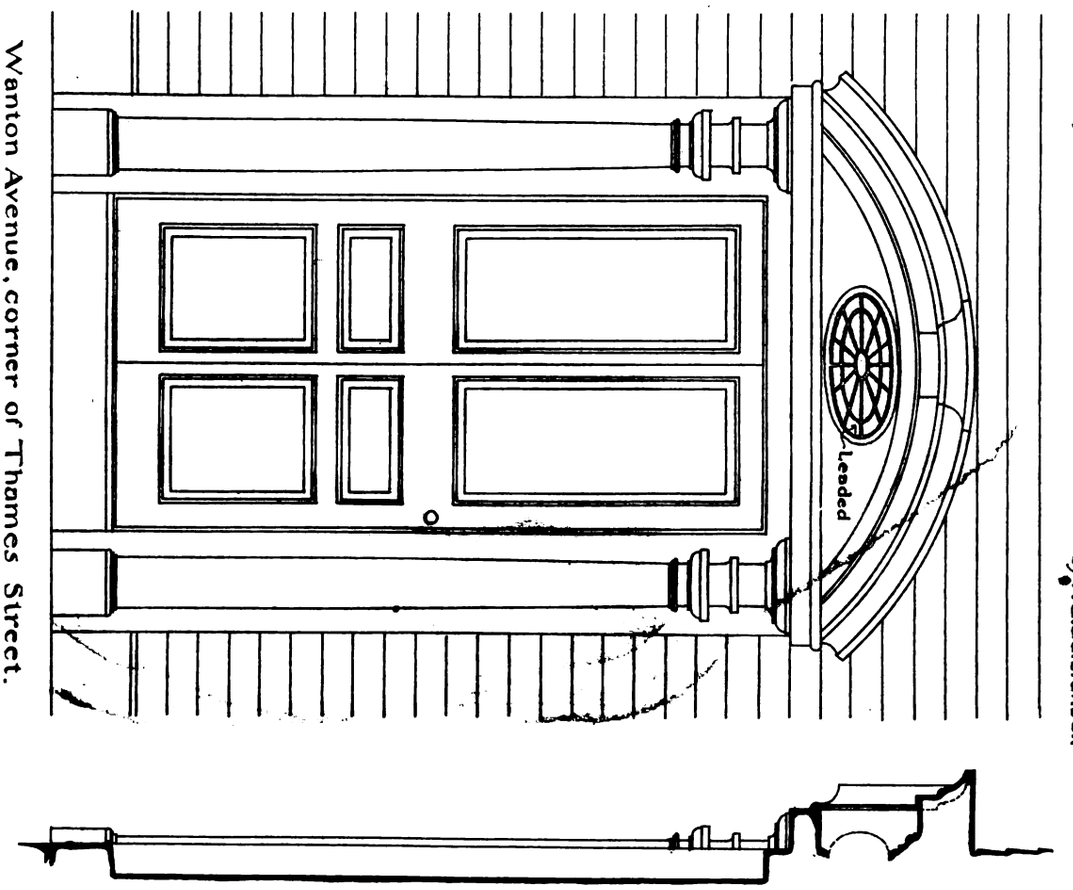
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Doorways from Newport, R.I.



110 William Street



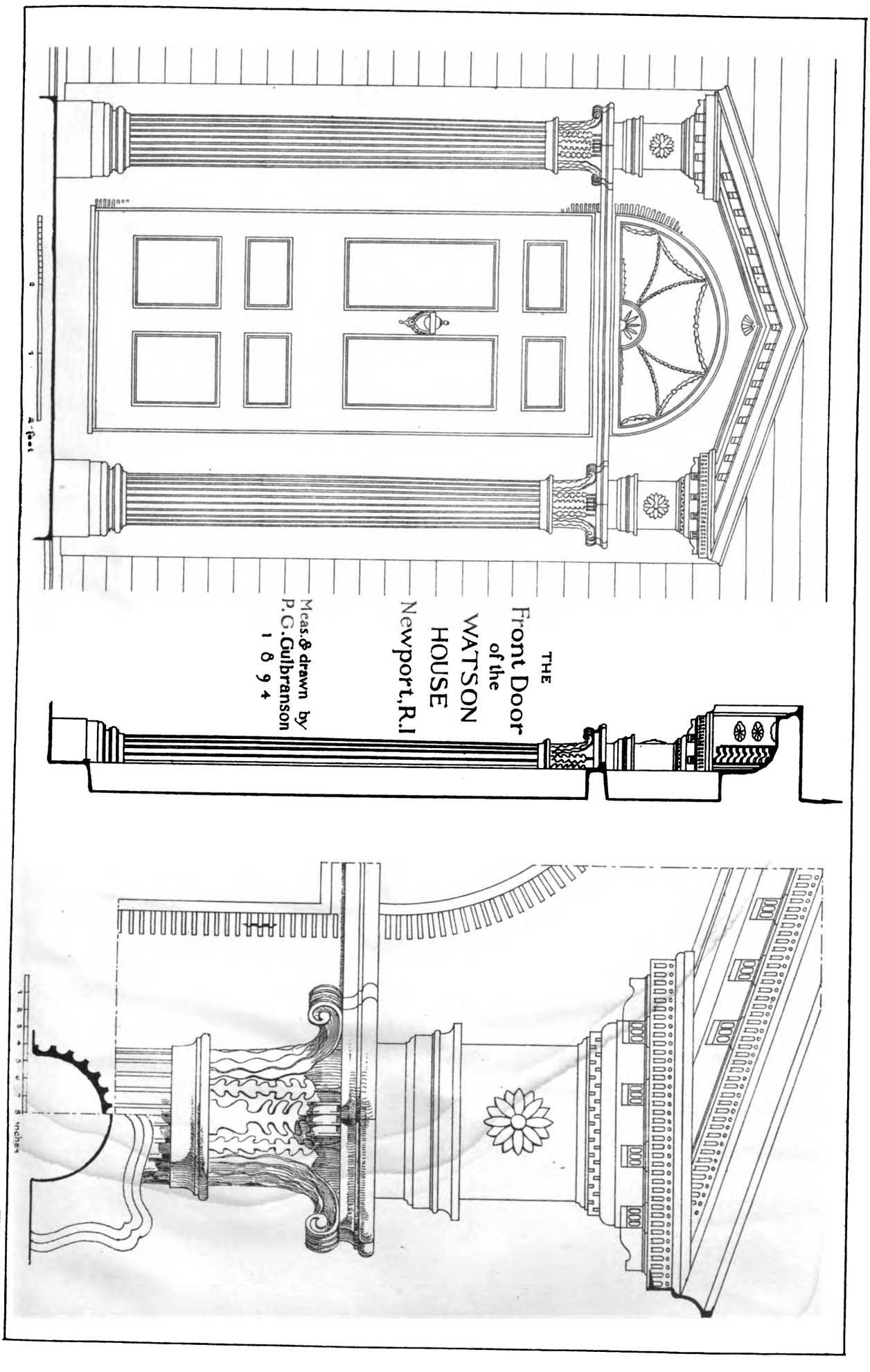
Wanton Avenue, corner of Thames Street.

Measured & drawn by P. G. Gulbranson 1894

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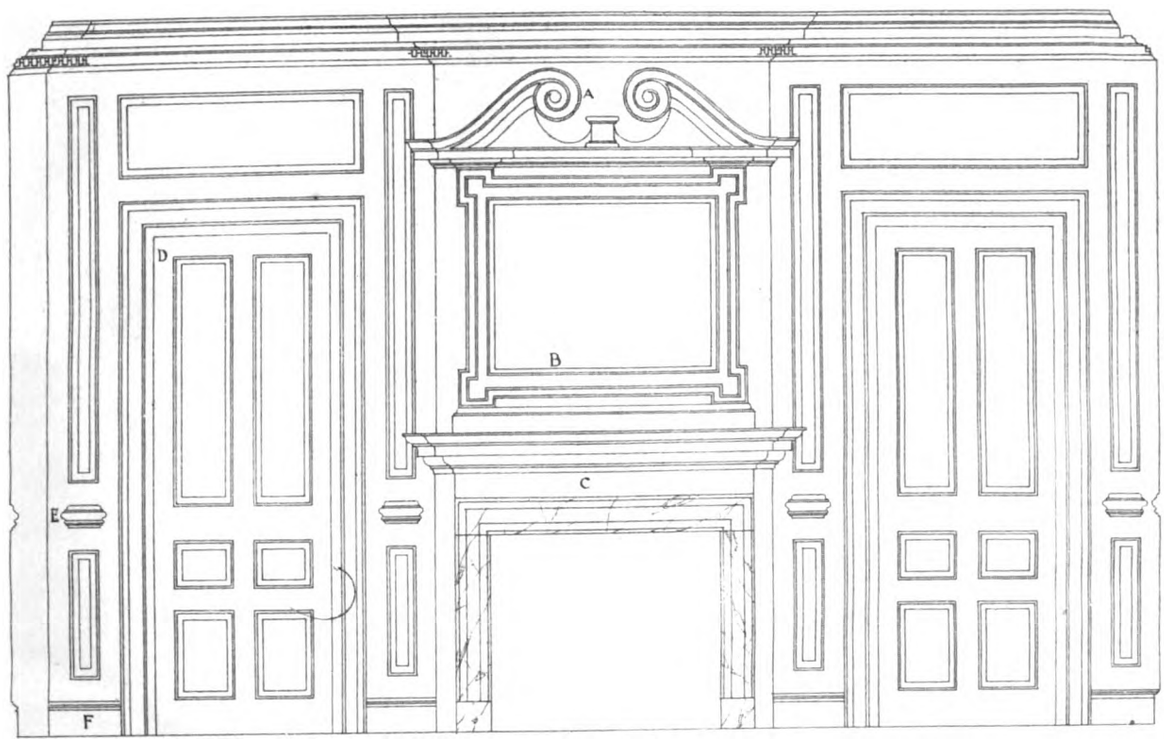
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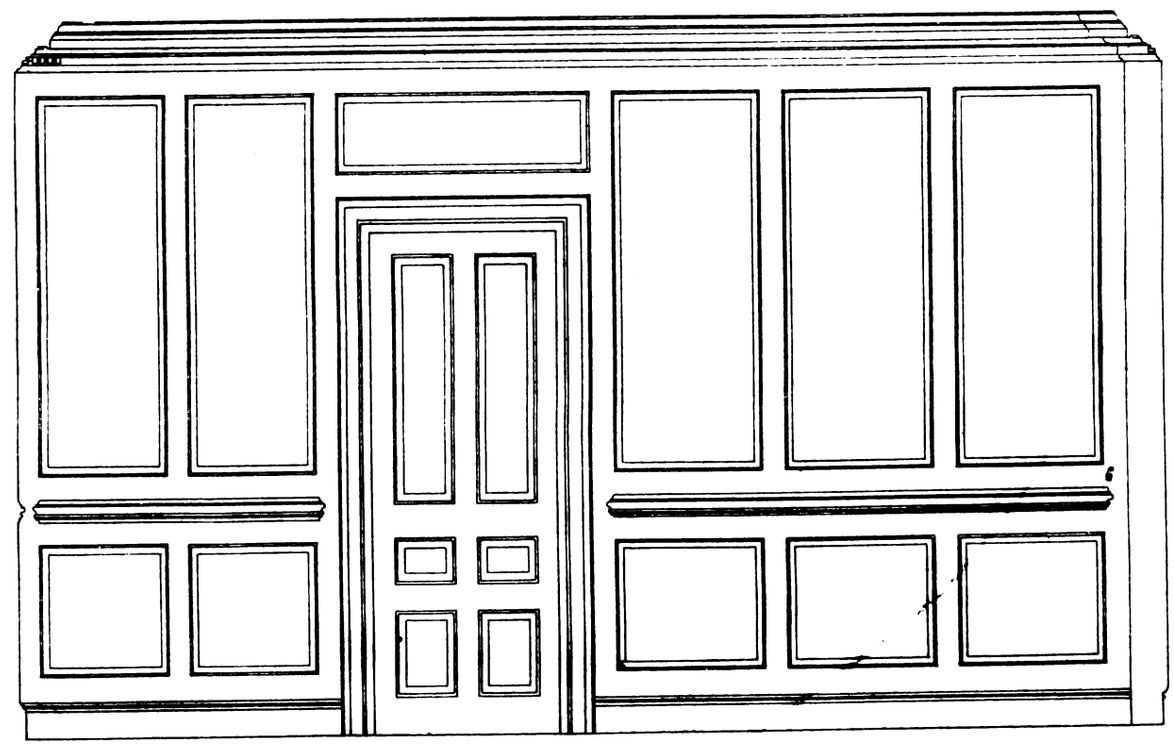
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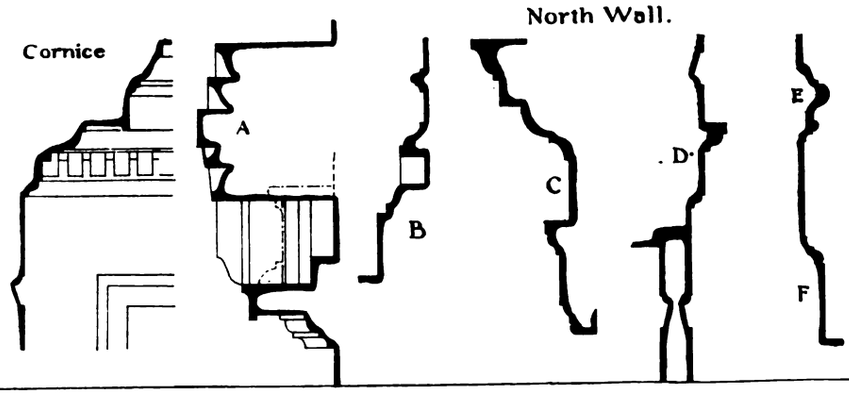
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East Wall.
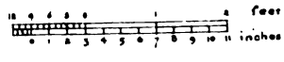


North Wall.



The Parlor in The Watson House Newport, R. I.

Measured by F. H. Lunte
Drawn by P. G. Gulbranson
1894



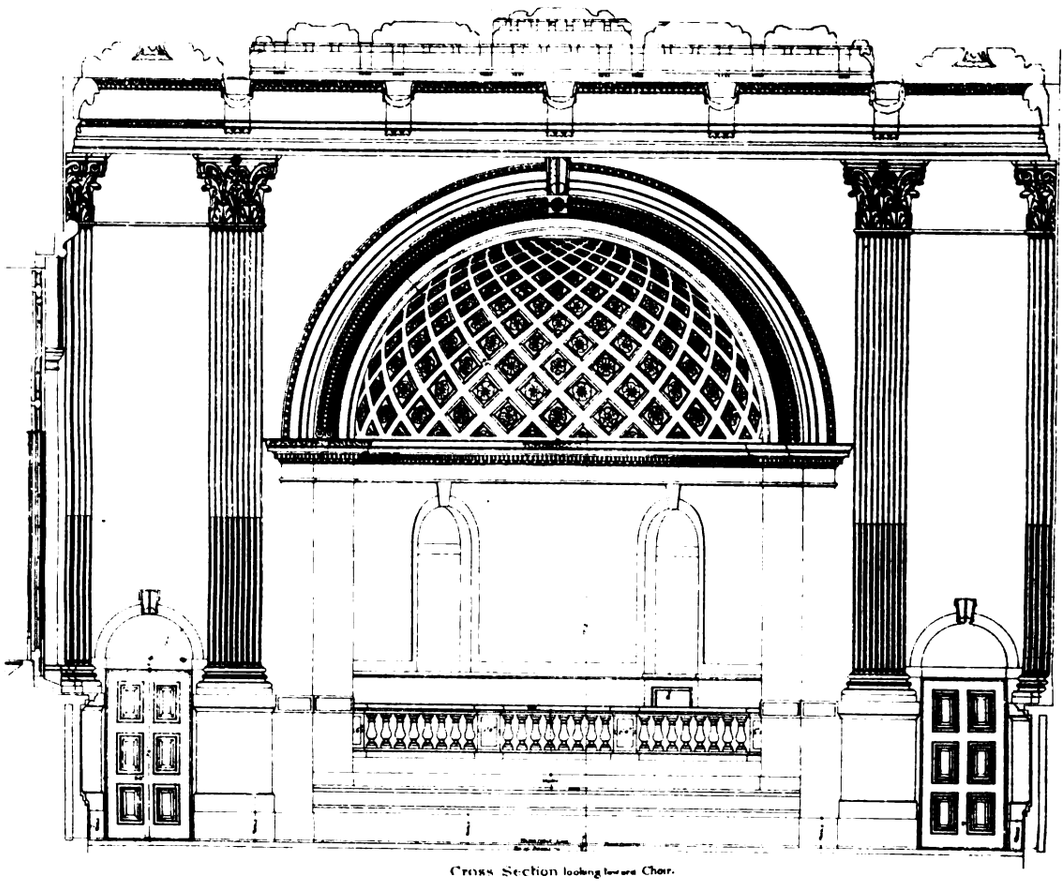
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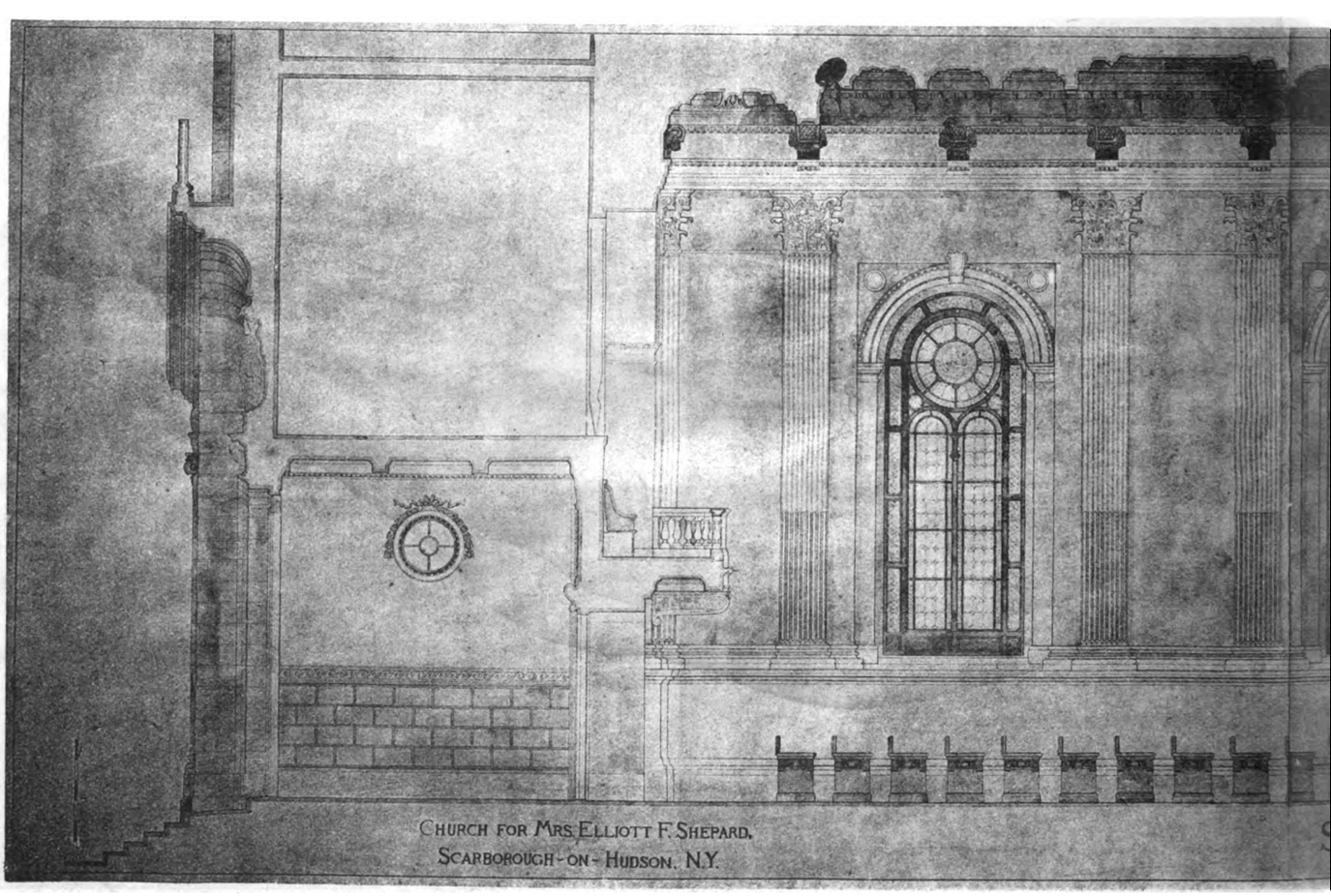
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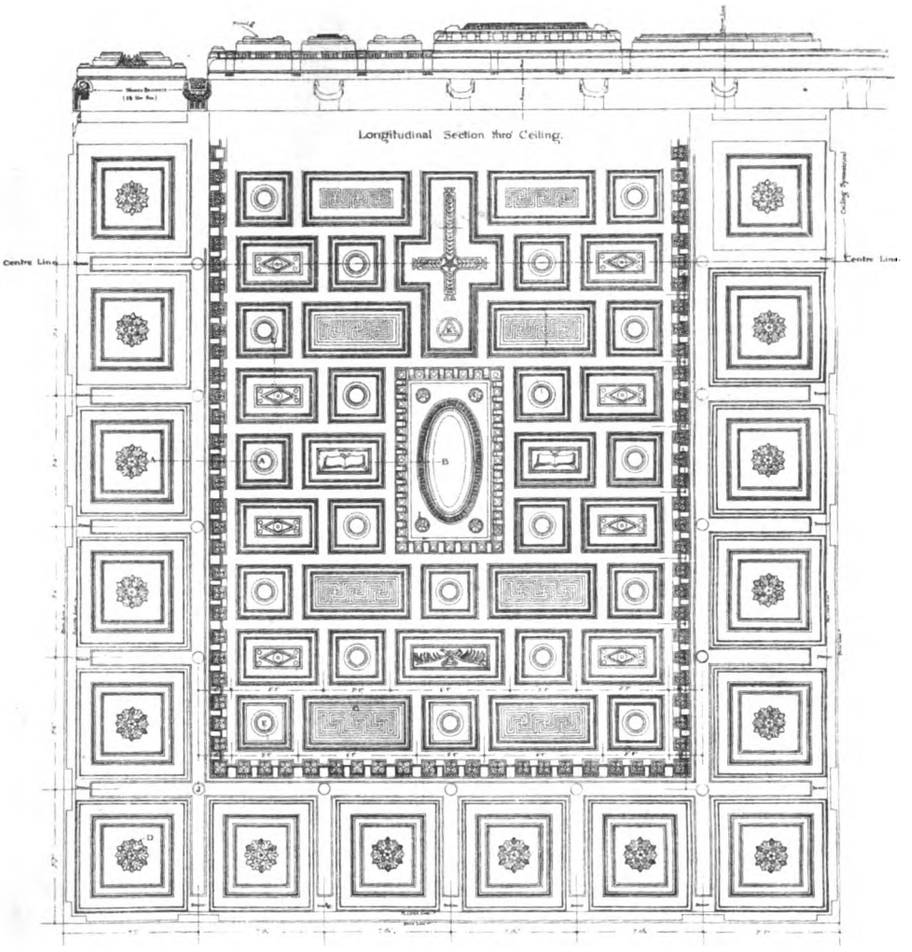
Cross Section looking toward Choir.



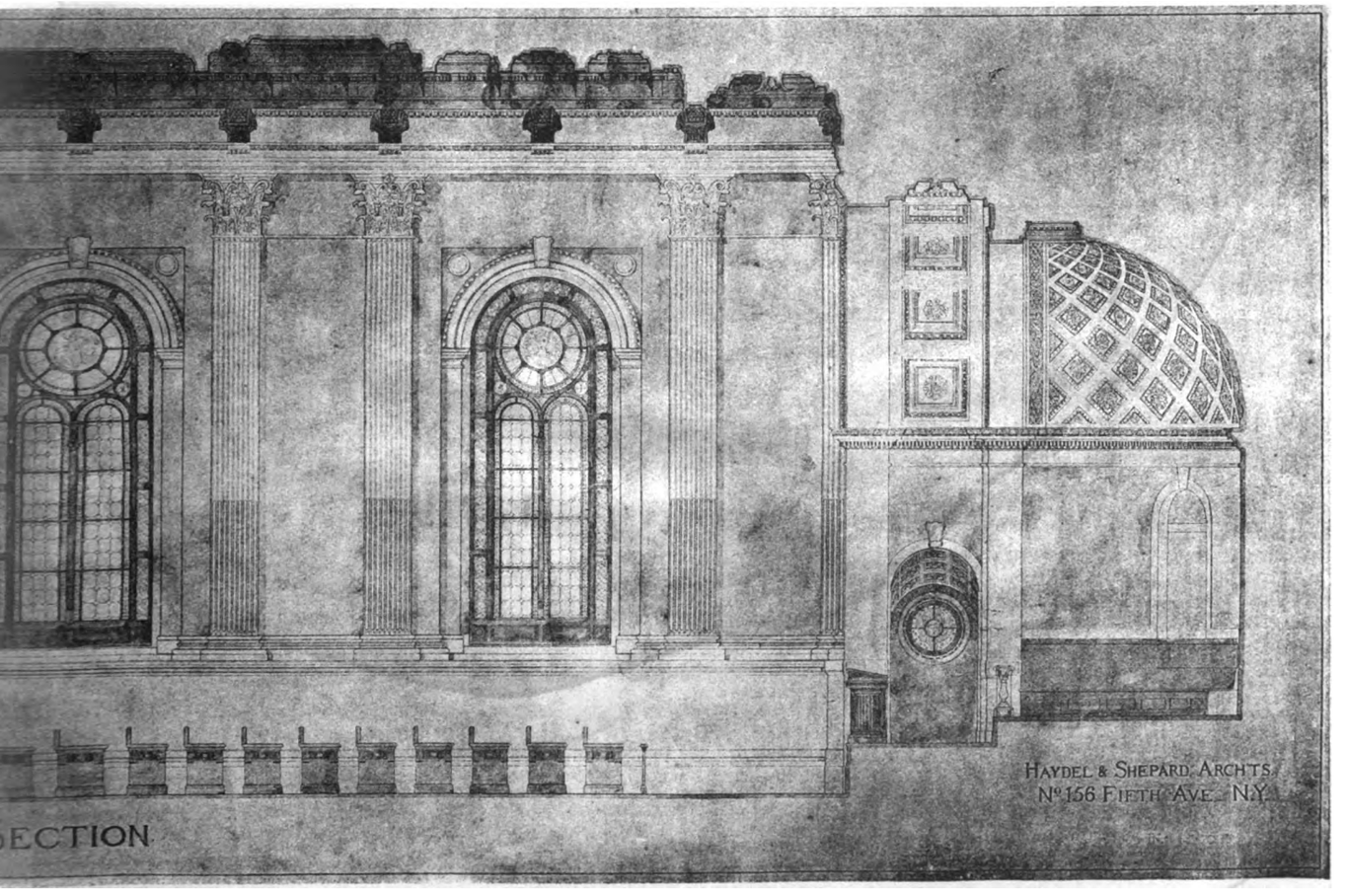
CHURCH FOR MRS. ELLIOTT F. SHEPARD.
SCARBOROUGH-ON-HUDSON, N.Y.

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Plan of Ceiling.



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SEPTEMBER 21, 1895.

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THE next Convention of the American Institute of Architects will have a special importance, as it will deal with measures of the utmost interest to the profession. It is not often that three amendments to the By-laws are proposed for action at one Convention, and it is still less often that three such radical measures are proposed together as those which the members of the Convention will be called upon to accept or reject. The first of the three amendments proposed introduces, in a moderate way, the principle of representation in the affairs of the Institute, by providing, in brief, that the Nominating Committee shall, at each Convention, consist of one duly-accredited Fellow from each Chapter having a membership of at least six Fellows. We imagine that every member of the Institute will favor this change, which gives the Chapters control over the choice of officers of the Institute. By this means the Chapters will be induced to interest themselves in Institute affairs to a much greater extent than is now the case, without taking so much from the prerogative of the Conventions as to suggest the idea of dispensing with them in favor of a government exclusively representative. To abolish the Conventions, with the opportunity that they give for personal acquaintance, and the exercise of personal influence, would be a great misfortune for the profession, and the proposed amendment seems to us to provide most happily for uniting personal and representative influence in professional affairs.

THE second amendment proposed is simply a correction of an amendment passed last year which provided that all Chapter members must be members of the Institute. The very diverse constitutions of the local professional associations, many of which had become Chapters of the Institute without change in their by-laws, made it very difficult to apply such a rule. In several cases, membership in the local society, which had, subsequent to its organization, become a Chapter of the Institute, was open, under the original by-laws of the society, to persons who were not eligible to membership in the Institute. The passage of the amendment made it necessary for such Chapters to choose between retaining their place in the Institute, by expelling those of their members, who, while in good standing under their own by-laws, were ineligible to the Institute, or resigning their Chapter charters, to take up again their independent career. Either course was undesirable, and the matter has, by the general consent of all parties, been left for this year's Convention to rectify, as it undoubtedly will. Connected with this proposition is one which provides that two Chapters of the Institute may be chartered in the same territory, if the officers of the Institute see fit to grant applications made in due form for such Chapters. This provision has certainly much in its favor. Especially in the large cities, architects divide naturally into cliques, drawn together by community of tastes or training. There are many reasons why this subdivision is desirable, and why certain cliques, as, for example, the Beaux-Arts architects in New York, or the German architects in Chicago, should have a definite standing and representation in the Institute. They can by such means present their views more distinctly than as members of a single large local Chapter, and the exchange and comparison of well-defined views on professional affairs is just what the Institute is most desirous of obtaining. The third innovation proposed is the substitution of an Executive Committee for the present Board of Directors; the Executive Committee to consist of the President, Secretary and Treasurer, and four other Fellows, to be chosen at each annual Convention. This simplifies the standing control of Institute affairs, both by reducing the number of officers, and making the method of their election less cumbrous; and there seems to be no reason why the experiment should not at least be tried.

A VERY curious technical point is to be decided by the Bureau of Yards and Docks of the Navy Department at Washington, and architects will be interested in the result. It seems, from the newspaper accounts, that the Government is building a dry-dock at the Brooklyn Navy Yard, and a large number of piles are to be driven. The site of the dock is now under water, and the contractors, in order to get the piles down to the requisite depth, place "followers" on top of them, and, by driving the followers, push the submerged piles to the necessary depth. To this arrangement, however, the supervising engineer, Mr. Menocal, objects, and claims that the contractors should sheet-pile the ground, and pump out the water to a depth sufficient to allow the piles to be driven by direct blows to the depth intended. As the contractors do not wish to do this, and Mr. Menocal is not willing to accept piling driven with a follower, it has been agreed to refer the question to the Department officials.

THE common impression among architects is certainly unfavorable to driving piles with a follower. According to the daily papers, Mr. Menocal considers that "the stability of the piling is jeopardized" by driving with a follower. What this means, we will not attempt to say, but we presume that Mr. Menocal's real objection is just that which any architect would make — that in driving piles with a follower, it is not only impossible to give as solid a blow as by direct impact of the hammer, but, owing to the varying rebound of the follower from the head of the pile, it is impossible to tell when piles so driven have reached the firm stratum to which it is commonly intended to drive them. As every one knows, the arrival of the foot of a pile at the bearing stratum is shown partly by the rebound of the hammer from the top of the pile, and partly, as well as more accurately, by the diminished distance to which it sinks under the blow. The sinking at the last blow is usually the most important factor in determining the load that the piles will bear safely, and it is of the utmost importance that it should be accurately measured. Where a follower is used, this essential measurement is rendered misleading. If it is measured, as is usually the case, at the hammer, all that can be shown is the descent of the follower. This may, owing to the crushing of its end, and of the corresponding end of the pile, be much greater than that of the pile itself; or, if the follower is elastic, and its tip well "broomed up," a blow on its top, followed by a lively rebound, may have a very insignificant effect in driving the pile below; so that data drawn from the sinking of the follower are nearly worthless for estimating the resistance of the piles driven with them. Iron plates, with sockets on each side, are sometimes interposed between the pile and the follower, with advantage, and it is to be hoped that the official investigation will serve to elucidate all these points.

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ACCORDING to the *New York Sun*, the Assistant District Attorney has been expounding to a reporter the law relating to buildings in a way that is rather startling. Speaking of the disaster at the Ireland building, he is said to have remarked that, "The building-law does not require that any excavations or borings shall be made to determine whether the subsoil is firm or not, but the builders should take these measures, and, if they do not, they are criminally liable for manslaughter, if a death results from their negligence or failure to do so." This would be good law in France, and will, undoubtedly, some time be good law here, but it would be interesting to learn on what American decisions this opinion was based.

THE Nineteenth Annual Report of the School of Drawing and Painting of the Boston Museum of Fine Arts shows a very satisfactory condition of affairs in this noted school. During the past year two hundred and fourteen pupils were enrolled on the school lists, and the Treasurer's accounts show a balance of receipts over expenses. The pupils come, of course, mainly from New England, but some are noted in the catalogue from Wisconsin, Illinois and Michigan, besides one from California and one from Nova Scotia. As before, the instruction includes painting, under Mr. Tarbell, drawing and painting from the nude model, under Mr. Benson, drawing from the cast, under Mr. Philip Hall, and decorative design, under Mrs. William Stone. Besides these, Mr. Platt has a class in modelling, and Mr. Cross one in perspective, and Dr. Emerson resumes this year his lectures on Artistic Anatomy. Next year, attendance upon these lectures will be required of all pupils drawing the figure, either from life or the cast, and the first-year pupils will be called upon to make, during the first half-year, a satisfactory drawing of the skeleton, and to pass an examination on its construction, and the names of the principal bones. This innovation appears to be a part of the plan devised by the Permanent Committee, for carrying out their avowed intention of raising the standard of attainment. As they say, "the Committee is not inclined to tolerate the error so common in this country, of regarding the study of art rather as an interesting pastime than a serious profession"; and they propose to hold regular exhibitions of the work of the students, and, perhaps, examinations, with a view, as they say, of "eliminating the poorer elements among the students," and of ascertaining "what pupils, either through a lack of seriousness, or a misapprehension of their talents, should be engaged in other pursuits than those taught at the Museum School." These are rather plain words, but the Committee could do the community no greater service than to carry out the plan thoroughly. There is plenty of good material in this country for making artists, but the material needs tolerably rough handling before it can be brought to the necessary degree of plasticity, and the school which applies most thoroughly the requisite discipline will soon find its reward in the results that it will obtain.

MANY Boston architects will regret to hear of the death of William Frye, the senior Inspector of the Department of Buildings of Boston. Mr. Frye was a native of Salem, but was educated mainly in Boston, and, after serving his apprenticeship, established himself there as a builder. For some time he was associated with Nathaniel Adams, a noted builder of the last generation; but, in 1873, soon after the establishment of the Department of Buildings, he was appointed inspector, and placed in charge of the mercantile district, by far the most important within the jurisdiction of the Department. In his official capacity, he was brought very much into contact with the architects of the city, and won their highest respect and regard for his unvarying courtesy, joined, as it was, with a modest firmness which admitted of no retreat from a position which he had once deliberately taken. At the same time, his decisions were based on a knowledge and experience which gave them great authority, even among architects. He was always much interested in matters relating to the art of building, and nothing pleased him better than a discussion of some theoretical point with an architect, who generally learned quite as much from Mr. Frye as the Inspector did from him. Within the past year or two, Mr. Frye's duties had become so arduous that he was obliged to share them with an assistant, but until within a few months he was regularly at his desk during the hours of office duty.

THE *Builder*, which is always interesting and instructive when it takes up the subject of Athenian archæology, gives an account of Dr. Dörpfeld's recent excavations on the western slope of the Acropolis, undertaken with the object of tracing the line of the ancient Sacred Way, the scene of so much Athenian life, and the route followed by the Panathenaic Procession. Most of the books on the archæology of Athens represent this Sacred or Panathenaic Way as ascending to the north of the hill of the Areopagus, and passing around its eastern side to reach the Acropolis. Certain texts seem to indicate that this was the route; but Dr. Dörpfeld, who studies archæology on the ground, as well as from texts, found that the grades around the north and east sides of the Areopagus were so steep as to make it very unlikely that chariots could ever have ascended a road laid out over them. It is certain that chariots passed frequently over the Sacred Way, and Dr. Dörpfeld, beginning a line of induction from this end of the subject, reasoned that, notwithstanding the texts, the chariots must have ascended the Acropolis over the only route by which such ascent is, or ever has been, practicable; that is, by its western slope, between it and the south side of the Areopagus. To this day, the high road from the city to the Acropolis follows this route; and, after a small portion of the old road had been laid bare, in searching for the site of the Agora, Dr. Dörpfeld followed these indications by excavations near the line of the present highway, with the result that a large part of the Sacred Way was found in a state of preservation, which left no doubt of its identity.

THE street through which, on the days of the festival of Athena, the girls of pure Athenian blood, attended by the foreign women of the city, who were obliged to hold umbrellas over the heads of the daughters of Athens, walked in procession to the temple of the goddess, under guard of the young men and boys of equal rank with themselves, is a narrow and rather winding thoroughfare, walled-in on each side with polygonal masonry, of limestone blocks. Notwithstanding its sacred character, in deference to which no one was allowed, on the days of the festival of Athena, to appear in it in clothing of any color but white, it seems, on ordinary occasions, to have been a commonplace street enough; and it was closely lined, in the historical period, with houses, the foundations of which are still in place. As the ancient street crosses and recrosses the modern highway, which is much travelled, Dr. Dörpfeld found it impracticable to lay bare those portions included within the modern highway limits, and was obliged to content himself with what could be found on each side. In one of the places thus partly covered by the modern street, just east of the hill of the Pnyx, he found, for example, a large number of wells, basins for water, the remains of conduits, and stones with heads, apparently used as fountains. A considerable portion of this collection of water-works is still buried under the modern highway, but Dr. Dörpfeld thinks that the place shows the site of the Enneakrunos, or Nine Fountains, made by Pisistratus and his sons, and fed from the spring Callirhoë, farther up the hill, which they covered over. The foot-path which led from the Sacred Way easterly, up the hill to the spring Callirhoë, and which was used by Athenian maidens for bringing water, was found in the course of the excavations, distinctly marked by turns in the limestone wall. After the construction of the Enneakrunos, the people of the city seem to have used it for their principal water-supply. For religious ceremonies, the use of this water was obligatory; and the demand upon the fountains seems to have been so great that several other springs were called in to increase the supply, pipes being laid from them to the fountains. In particular, water is brought from the upper portion of the river Ilissus, by cylindrical earthenware pipes, glazed inside, and jointed with lead. A large portion of this line of pipes, which dates from the sixth century, B. C., still exists in place, but the pipes themselves are choked with a deposit of lime from the water. A considerable part of the line is laid in a tunnel, cut through the rock. This tunnel is in some places forty feet below the surface. It is large enough for a man to walk through, and is ventilated by shafts to the surface, while the pipes, which lie on the bottom, have hand-holes for cleaning. A very similar tunnel, containing pipes precisely similar, is found in the island of Samos, and is known by inscriptions to have been constructed in the sixth century, B. C., by Eupalinos, of Megara, for Polycrates, the tyrant of Samos.

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THEATRES.[1] — XX.

THE EMPIRE PALACE, BRISTOL.



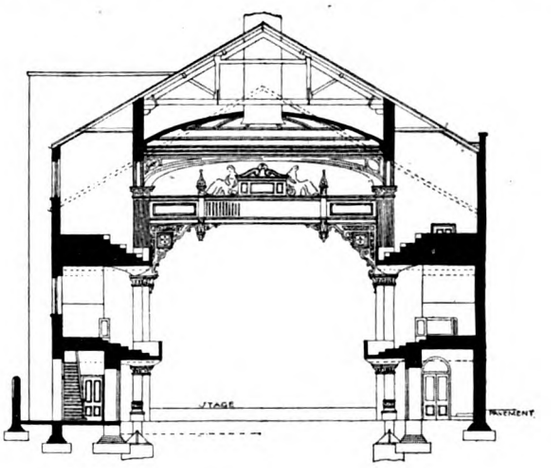
Plan of the Empire Palace, Bristol.

THE subject of the present chapter is one of the new provincial variety theatres which are rapidly springing up all over England. The improvement in recent years of the "music-hall" performance has, by drawing a better class of people to such entertainments, created a demand for larger, better and more elaborate buildings than those which satisfied the public some ten years ago. Messrs. Wylson & Long are the architects of the Empire Palace, Bristol, and have given special permission for the production of their drawings in the *American Architect*.

The theatre consists of a large pit on the ground-floor, 81 feet three inches deep by 52 feet wide, from which there are four exits. Immediately over the pit is the balcony, consisting of six rows of seats, with a wide promenade and raised buffet in the rear, from which a full view of the stage can be obtained. The gallery or second tier has eleven rows of seats and is provided with two separate exit staircases. The principal entrance to the theatre communicates, by swing doors, with an inner lobby leading directly to a large vestibule, from which opens the grand staircase leading up to the balcony and down to the stalls-corridor.

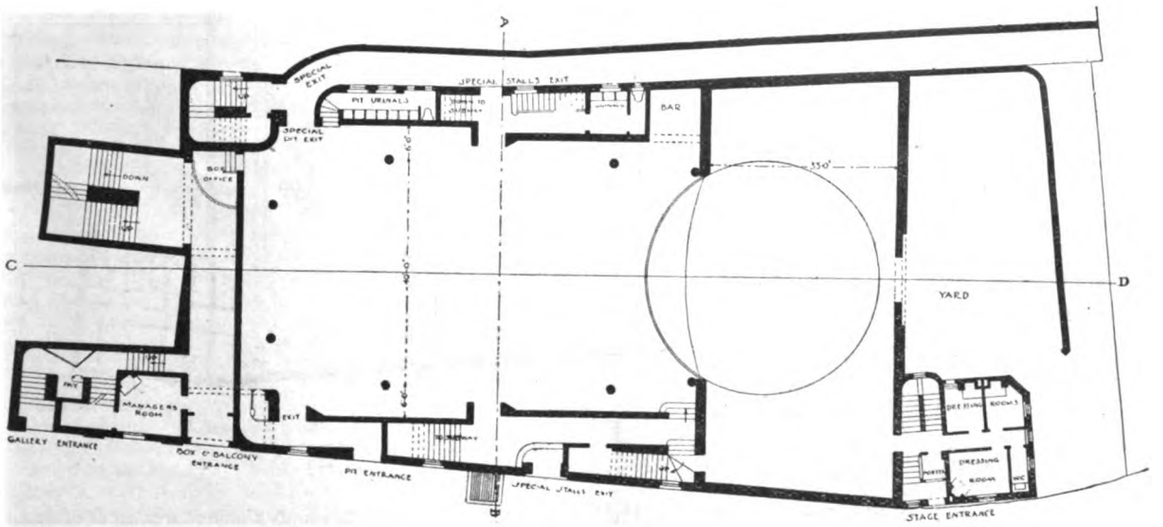
In the designing of the auditorium, particular care has been taken to provide that every part of the house shall command a good view of the performers, and for this reason the theatre has been constructed on the cantilever system, with as few supports as possible. Indeed, there are only four main columns, two of which are incorporated with the construction of the boxes, and these are joined at the top by elliptical arches, carrying a dome forty feet in diameter. Iron and concrete enter very largely into the construction of the entire building, thereby reducing the risk, from damage by fire, to a minimum; while the ample exits that are provided enable the audience to rest in perfect safety. To add to these precautions, fire-hydrants are provided to command the several portions of the house.

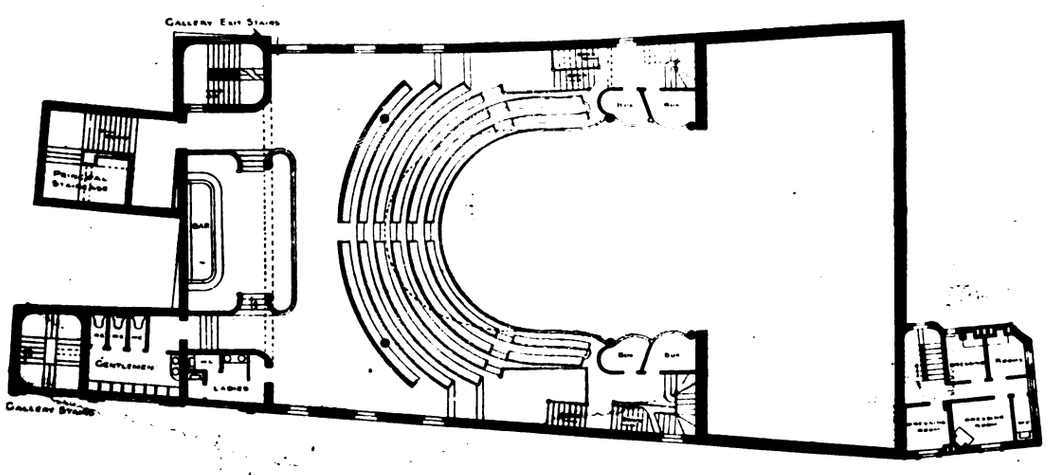
The Empire is said to be one of the finest variety theatres in the



Provinces, and is designed in a free Oriental style which readily adapts itself to the internal and external decoration of the building. In the front to Captain Carey's Lane, the elevation of which is here given, red bricks, with dressings of bath-stone introduced in bands and mouldings are used, while the frames and sashes of the pointed doors and windows are painted in light and dark tones of peacock-blue, which form a strong but pleasing contrast to the colors of the other materials used.

The color-decoration of the interior is carried out in warm tints

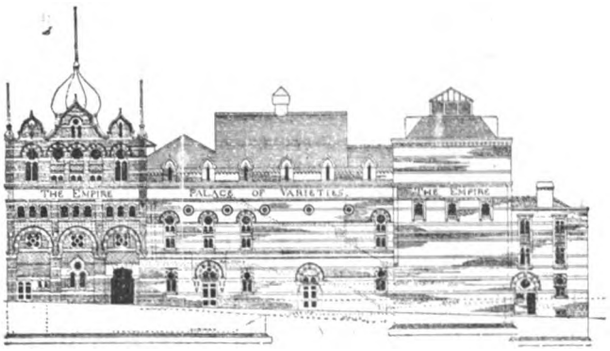




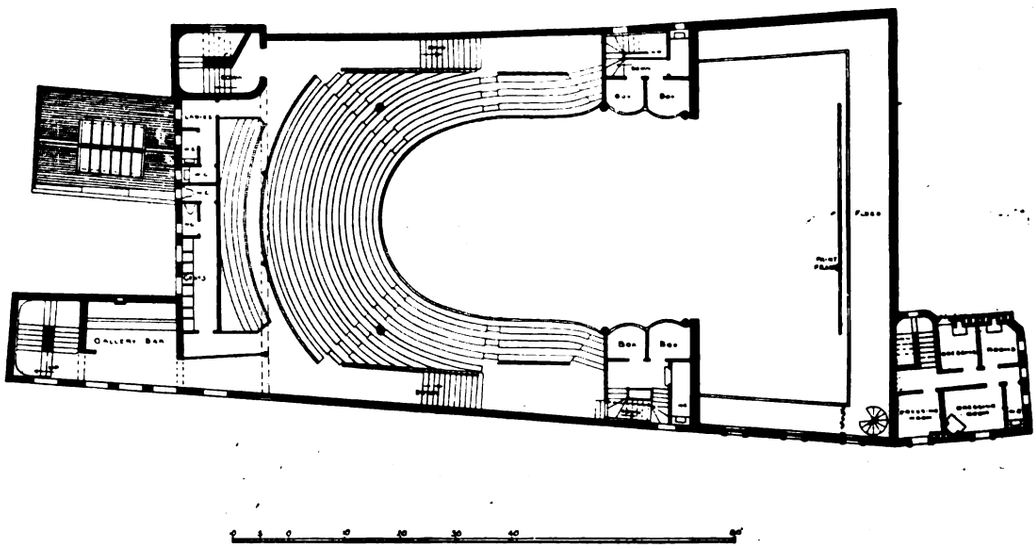
[1] Continued from No. 1027, page 90.

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in which blue and red predominate, harmonizing with the upholstering of the seating, which is blue throughout; rich figured-plush curtains drape the boxes and tableau curtains of the same material fill the stage-opening.



The building is lighted throughout by electric-light, and in case of temporary failure, an auxiliary supply of gas is provided, together with a powerful gas sun-burner, which in communication with an extractor acts as an efficient ventilator.



It will be noticed that special attention has been given to the accommodation of the performers, and that a separate building, erected in the rear, contains the dressing-rooms which are thereby cut off from the dangers of fire arising on the stage.

The stage is very commodious, and is, including the wings, of a width of 72 feet, with a minimum depth of 32 feet, and is thus sufficiently large for the production of any class of performance, including ballets and pantomimes. In short, everything has been done to make the new Bristol Empire worthy of the city, and a fitting place of amusement for its large population.

The following are the chief dimensions of the building:

Width between the main walls	68.0 feet.
Depth between back wall of pit and curtain line	83.0 "
" from front of balcony to curtain line	47 0 "
" " " gallery " " "	57.0 "
" " back of stage " " "	33.6 "
Width of stage	72.0 "
Height from pit floor to auditorium ceiling	48.0 "
" " stage floor to gridiron	48.0 "

The seating-capacity of this house is:

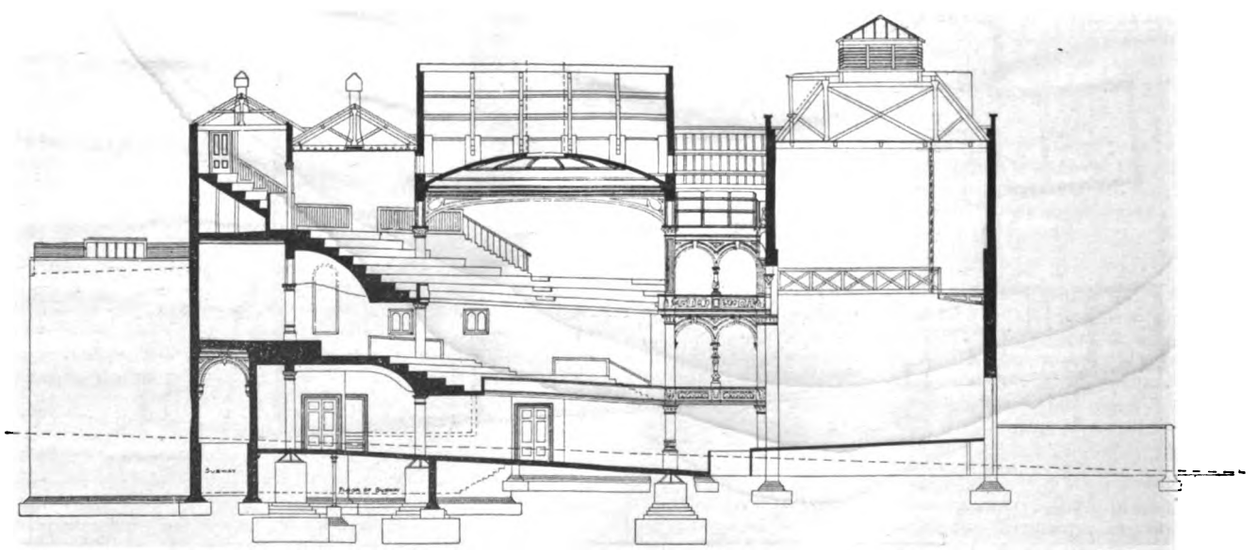
Pit	338
Stalls	218
Balcony	246
Gallery	542
Private boxes	32
Total	1,376

E. A. E. Woodrow.

(To be continued.)

ARCHITECTURE AT THE SEASIDE.

AMONG the manifold impressions of a summer's outing among our American watering-places, none is stronger, upon one who takes notice of that sort of thing, than that made by the extraordinary growth of many of our so-called "summer cities." When one considers the enormous sums of money expended annually in building and lavished on these summer homes, he cannot but regret that more careful study has not been given to this class of architecture. That the seashore demands a unique treatment of architecture is plain. In all periods, throughout all lands and in all styles, a strict relation has been preserved between architectural forms and topographical characteristics. How clearly this æsthetical influence



of landscape upon architecture is exhibited in a comparison of the lines of a Venetian palace and a Tyrolese castle!

Usage in this regard, of course, does not conform to any code of hard and fixed rules. Custom is rather the outcome of the influence

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of natural conditions upon taste than a result of æsthetic training. Yet how sensibly do we feel a decided offence against fitness in this respect. It is often difficult to explain where the trouble lies; we know that there is something wrong, something distasteful, and that is sufficient.

It would be impossible to find, in the whole world, greater opportunities for the display of taste, more varied natural conditions of scenery and climate than are afforded by our Atlantic sea-board from the rugged coast-line of Maine, along the bluffs and headlands of Massachusetts and Rhode Island, to the level shining sands of Long Island and New Jersey's sandy beach and smooth green meadows. Yet there is no place where one sees the unwritten law more frequently fractured, no place where incongruity and discord have been more firmly combined to do violence to the sensibilities of the unoffending observer than at our seashore resorts.

It is not difficult to find the reason for this. In the search for a suitable style much originality has been shown, and this is highly commendable. Our seashore resorts are new and very different from those of the Old World, and we want a new and original style. But, unfortunately, so great is the originality, that no considerable number of architects have shown the slightest agreement of ideas on the subject: the result is, therefore, far from satisfactory.

The watering-places of England and France are old; their architecture is the result of long experience, and we may unquestionably benefit by it, for the coast of England and the north coast of France are not unlike portions of our own seaboard. Along a coast more or less uneven, where sea-frontage is not the main feature, as at Bournemouth or at Etretat, a somewhat irregular style prevails. The houses have more the character of a typical villa than our own have. People who can afford it have sufficient space about their houses to give them a good setting of lawn and trees, and to have the stables inconspicuously situated at a distance from the house. The house itself is large, simple and picturesque in design. It shows no striving after conspicuousness, but rather after elegance. Even the wealthiest abroad build houses of a modest style, making up for richness and display in simplicity and taste.

The materials employed are largely stone or brick, building with these being much cheaper there than here; but a whole marble palace in the style of Michael Angelo is seldom seen by the sea. It would rather offend a Frenchman's taste. Such a building might be suitable beside the blue of the Mediterranean, under the Italian sky, with a background of dark ilex groves and other classic surroundings, but by the gray-green of the Atlantic, beneath a cold northern sky, and with little verdure not parched and brown, the Classic porch would seem rather far from home.

There are also resorts where the sea-frontage is in great demand, as at Brighton and Torquay, where the straight conventional shore is terraced and graded. Here the houses and hotels are, of necessity, built in a long unbroken line; their architecture conforms to such conditions, and we see elegance and repose in the horizontal lines of the façades, a monotony in the straight sky-lines, in the symmetry of fenestration and colonnade, in perfect consonance with the continuity of the grand horizon.

The houses of those of smaller means are quite as attractive. These are, of necessity, more closely situated, often on narrow lots, as at Cabourg or at Houlgate, near Trouville-sur-Mer. They are situated only a short distance back from the edge of the sloping sea-wall (a universal feature of the French sea-towns), which forms a pleasant promenade above the sandy beach. The materials used are both wood and brick. The houses were designed by some of the ablest architects in France, and though the style of all is similar, there are no two alike. Their colors present various shades of soft grays and browns brightened by the red of the roofs and chimneys. The effect of a group or long row of such cottages with their shady gardens, inclosed in vine-clad walls, at the rear is very picturesque.

Let us now glance at the architecture of one of our seaside resorts and endeavor to find, by the light of comparison, some of its faults. In the first place, we shall discover, in many instances, an overwhelming extravagance. Every man's house is *literally* his castle. Huge mansions of baronial style are crowded upon little lots in rows suitable only for modest cottages. It is the pitiable, insane desire in Americans to make a costly display, lavishing expense upon the house and taking little thought about the land; but the display here is simply a foolish waste, for a manor-house without its park loses all its dignity, and castles in rows are absurd.

The same extravagance is seen in these very forms of architecture. Towering structures, with steep broken roofs, all pinnacles and turrets, with oriel-windows and overhanging balconies, are typical of rugged mountain scenery, where peaks pierce the clouds, and crags stand out in bold relief. But beside the sea, where the level line of the horizon is the characteristic feature, a stretch of sand or a line of bluffs and green fields making up the scenery, a long low structure, sloping roofs and broad verandas, and, above all, plenty of space, seem much more compatible with the surroundings.

A second difficulty must be pointed out in what may be called inharmoniousness — a lack of harmony in form, in style and in coloring among the groups of houses which make up our seaside towns. Were the distance between the houses greater, this objection would loose much of its force, but as it is, the confusion is bewildering. It will not be necessary to explain what is meant here: every day we see extremes placed, side by side, the two forms just described, the pointed and pinnacled and the broad and low, almost touching each other over the narrow boundaries; reds and yellows, greens and grays wage continual hand-to-hand combat, as if each man had painted his house with a view to killing the effect of his neighbor's, although he thereby commits both murder and suicide.

There is a wide distinction, which some do not seem to grasp, between variety and difference. It is never necessary to sacrifice harmony for the sake of contrast, but very easy to secure both. One of the chief charms of the sea and seashore is the delightful restfulness and monotony, monotony which, in reality, is ever changing with the variation of wind and weather, of light and shade. Why may not nature be imitated in art? Should not each house be a type of the class of seashore residences with as many variations as the owner pleases, but having some relation to its environments? Should not the colors employed by all reproduce the exquisite blending of sombre tones which makes marine views so attractive? It is unquestionably the

> "Patchwork of Japan,
> And queer bits of Queen Anne,"

the juxtaposition of styles wholly incongruous that detracts most seriously from the beauty of our seaside architecture.

These two difficulties form a third drawback. They deprive the architecture of its meaning. Of course, all architecture has its significance, from a church to a theatre, from castle to porter's lodge; if religious service be held in the theatre, or a play be given in the church, if the lord moves into the lodge and the porter takes up his abode in the castle, the architectural significance of the buildings will be still unchanged. People seek the seashore for rest generally, for health often and for a good time always. Should not the architecture of the seaside suggest some of these things? Should it not be an expression of quiescence, of refinement and of homelikeness?

Castles suggest siege and attack; palaces the tiresome routine of court life, while prismatic warfare suggests anything but the above requirements. On the other hand, broad roofs and verandas suggest rest and protection from the sun, from severe winds and heavy rains; spaciousness is hospitable and inviting, while a little consideration for the color of our neighbor's house would contribute largely to restfulness, good digestion and friendly feeling, besides giving a far more artistic general effect. HOWARD CROSBY BUTLER.



:CANADA:

THE WATER-SUPPLY PIPES OF TORONTO AGAIN AFLOAT. — CAUSE OF THE ACCIDENT. — BUILDING OPERATIONS AND THE CROPS. — THE CHICAGO DRAINAGE CANAL AND ITS EFFECT ON THE LAKES.

THE City of Toronto has again been visited by disaster, and this time of a character far more general in its probable evil results than were the three great fires of the early part of the year. For the second time in two years the water-supply of the city has been cut off — for the second time the "new" steel conduit across the foul harbor of Toronto Bay has burst and risen in sections to the surface. At Christmas-time, 1893, when the Bay was covered with ice two feet thick, the conduit made its appearance through the ice, and was only completely repaired at a cost of fifty thousand dollars, the repairs extending over a period of nearly twelve months. It was well known that these repairs were only of a temporary character — the nature of the work did not admit of anything better. The question was one of providing good water, while other schemes for a permanent supply were under consideration. It must be remembered that when this steel conduit was laid and completed only in the preceding year, at a cost of some six hundred thousand dollars, it was understood that at last the city had obtained a faultless system, and that the annual outcry against bad water had ceased forever.

The system consists of a four-foot riveted steel pipe, starting at the pumping-station on the main land, and extending across the harbor towards the island (that almost makes the harbor, or bay, into a lake), a distance of 4,660 feet. This is continued by a five-foot steel pipe, in the same direction, for 6,027 feet, through the sand-bank, or island, and to this is added a six-foot wooden pipe running out into the lake 2,357 feet. This is connected with a six-foot steel pipe, 365 feet long, which forms the intake, and, at its southerly end, is sunk into 70 or 80 feet of water. Into the bay, or harbor, all the sewage of the city is conducted. The bay is a mile and a half wide from north to south at the widest part, and about three miles long from east to west, its greatest depth being forty feet. On the morning of September 5, about 150 feet of the five-foot pipe, covered with mud and weeds, with terrific commotion burst up, rising some twelve feet above the surface, and then settled down on the surface. In this part is a movable joint, put in for the purpose of allowing the pipe to accommodate itself to the uneven bottom of the bay. A second break, and the worst of the three which have occurred, is a quarter of a

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mile farther south. Here the sections of the pipe were connected by cast-iron flanges, riveted to the steel pipe and bolted together. Now one part of the great tube raises its entire diameter above the surface, while the section to which it was connected lies more than half submerged, and slopes downwards to the bottom a few hundred yards farther on. The third piece of piping shows on the surface, but here there is a "universal" joint that has stood the strain, although, of course, the various joints of the pipe, still below the surface, are probably strained and open. A careful investigation is now in progress to attempt to discover a cause. The city engineer, Mr. Keating, is in no way responsible for this second disaster to the piping laid by former engineers, when the water and engineering departments were separate bureaus. He has described the situation very plainly over and over again, and shown how the water system was "hanging by a thread." The result was that a by-law was submitted to the people for raising a sum to bore a tunnel, by which water was to be supplied to the city, instead of by the conduit, but this appropriation was lumped together with other sums for purposes objectionable to the majority of the ratepayers and it was vetoed.

The probable cause is the unusual lowness of the water, and the engineer stated a few days ago that if the water of the Lake fell two feet more the pipes would not run full.

It will probably be many months before the city will be in the enjoyment of pure water, and a considerable sum will have to be expended. People are warned that all water must be boiled for drinking purposes, for we have nothing but the sewage-laden waters of the bay to draw from.

It would almost seem as if the "water" trouble would never cease. During the period of the winter conflagrations, there was not sufficient power to raise the water, by the firemen's hose, to the top of the burning buildings. The fire appliances have been considerably increased through the summer, and there are now three steam-engines to give the required force, the absence of which was so disastrous before. No sooner have these arrived and been tested and found satisfactory, and the Underwriters began to contemplate reducing the rates of insurance, which they raised after the fires, than the water-supply fails and the engines are almost useless, for the pressure is reduced tremendously. Since the above was written the cause of the disaster has been discovered. There are several man-holes constructed in the channel under which the conduit runs at the island. In one of these was found an eight-foot plank, sixteen inches wide and three inches thick, its foot embedded in sixteen inches of sand and rising diagonally up into the man-hole, thus obstructing the passage of the water, sufficiently to cause the disaster. The plank was thoroughly water worn, suggesting that it must have been a long time in water, and the only theory as to how it got there is that it must have been part of the old cribwork or wooden conduit that was removed to make way for the last lengths of steel piping put in two years ago. Somehow or another, it must at that time, unseen by any one, have been sucked into the new pipe, and it has taken it all this time to travel the 2,000 feet and to become the cause of the accident. It remains a mystery as to how it raised its end up so as to catch and rest against the side of the man-hole, but there it was when the place was examined. Having now been taken out, it should be transferred to the Museum and kept properly labelled, as a warning to all who have to do with similar works. No money will be spared or time lost in making the repairs. A temporary intake will be constructed in what is known as "Blockhouse Bay" — a bay on the city side of the island, which is almost cut off from the bay proper by a sand-bank, and in which the water is purer than that in the bay, and in a few days the engines will be able to pump to their full power again. Precautions have been taken to guard so far as possible against the use of the impure water for drinking purposes. The mayor of the Town of North Toronto has offered to the city a supply of 100,000 gallons a day of water from springs, which now supply that place. The offer has been accepted, and some fifty of the city water-carts are to be used to bring this precious gift to the city. It is intended to supply first all the public schools and other institutions, and if the supply will permit and the scheme can be organized, half a gallon a day is to be left at every house, or else great hogsheads are to be placed at the corners of the principal streets, guarded by an officer of the police (to prevent waste) that the thirsty may go there and drink. While repairs are being promptly undertaken, and all the authorities are acting with commendable energy, it has been resolved by the aldermen to submit again the former by-law for money to construct the tunnel, and this time one might bet with certainty on its passing.

At last the ruins of the winter conflagrations are giving way to the new buildings which are to replace them, and the bedraggled look of the principal streets is vanishing. There appears to be a little spurt in the building-trade generally, but the majority of architects are still complaining that there is nothing doing. Beyond the rebuilding of the places burned down, there is very little going on; prices are ruinously low, and it is getting too late in the season to hope for better things this year. The result of the magnificent harvest will not be seen just yet, but in a country like Canada, which depends so much upon its harvest for its prosperity, it is hoped that there will really now be a turn of the tide and that the long period of depression is at last drawing to a close. The holidays will all be over at the end of this month, and then probably we shall find that several works are contemplated for next spring.

The possible effects of an injurious nature, upon the levels of the Lakes that may follow the opening of the Chicago Drainage Canal, are (it is reported from Washington, D. C.) exercising the minds of the United States authorities even more than they excite the authorities of the Dominion, but both appear to be fully alive to the idea that harm of a serious nature is likely to occur. The report of the Board of Engineers, appointed by the Secretary of War of the United States Government, is published in the daily press, and may find its way into the columns of this journal. At any rate, it is hardly my province, in the limits of this letter, to refer particularly to it, except as the subject affects Canada. The Lake Carriers' Association is, we are told, making every effort to prevent the completion of the canal, and has obtained the coöperation of the Canadian engineers and shipping interests to oppose any steps that would result in lowering the levels of the Lakes. Captain McElhinney, of the Marine Department, is of opinion that the Lakes are lower now than they have ever been "since they were navigated," and says that the United States have far more to lose than has Canada by the Chicago Canal, so that it is not likely this great work will be allowed to proceed. This, of course, remains to be seen. It is, naturally, a matter that cannot be settled off-hand.

THE DUC D'AUMALE AND THE CHATEAU D'AMBOISE.

It is fortunate for the Republic, says a Paris correspondent of the New York *Tribune* writing under date of August 21, that the Duc d'Aumale does not stand in the position of a pretender to the crown of France. For he would be infinitely more dangerous as such than the Duc d'Orléans, Prince Victor Bonaparte and Don Carlos are for the present, or the Comte de Paris and the Comte de Chambord have been in times past. Alone of them all he appears to understand that one of the principal qualities which the public looks for in royalty is generosity and a readiness to distribute riches in doing good and in relieving distress. None of the other princes above mentioned can be said ever to have fulfilled this popular expectation. Indeed, they seem to have considered it more blessed to receive than to give. Thus the Comte de Chambord's riches have gone to swell the fortunes of foreign kinsmen, even the historic château and estate of Chambord, purchased with money raised by public subscription and presented to him as a token of loyalty on the part of the Royalist element in France, having been bequeathed to an alien prince. The Comte de Paris's money was hoarded for the benefit of his family, and not even his followers, let alone the public, can be said to have ever derived any benefit therefrom. The Duc d'Orléans is extravagant only where his own pleasures are concerned, and has already won for himself an unenviable name in connection with the shabbiness of his behavior in money matters to his followers, especially to those French noblemen who have taken upon themselves the duty of serving him as gentlemen-in-waiting without remuneration.

The Duc d'Aumale, however, the only one of all these royal personages who has achieved fame as a soldier, and to whom France is in a great measure indebted for her great African dependency in Algeria, is conspicuous for his public spirit. He had scarcely returned from the exile decreed against him through the artifices of General Boulanger, a man deeply in his debt for many favors received, than he presented to the French Nation his superb palace of Chantilly, with all the priceless treasures of art, literature and history that it contains, and the park, gardens and surrounding forests as well, merely reserving to himself the right of enjoying the use thereof for the remainder of his life. It is a gift the financial value of which it is well-nigh impossible to estimate, and enhanced by the fact that the Duke has lavished both time and untold money in perfecting the architectural beauties of the château, and in adding unique masterpieces to the various collections that are set up within its walls. And now, as if this were not enough, he has announced his intention of purchasing the grand old château, or rather palace and estate, of Amboise, in the Touraine, for the purpose of converting it into a home for soldiers and sailors, especially for those who have sustained wounds and injuries in active service, and who, for one reason or another, can find no place among the veterans at the Hôtel des Invalides.

The purchase will be made at the sale, which is about to take place, of the real-estate in this country left by the Comte de Paris. This sale is in accordance with the requirement of the French law, which ordains that whenever any of the children of the dead man happen to be minors and unable therefore to effect any legal agreement with regard to the division of parental property, the latter shall be converted into cash, so that an equal distribution can be made. In such cases the auction is a mere matter of form. The various pieces of real-estate are advertised for sale at the lowest possible prices, and everything is bought in by members of the family. Thus, in the notice of the projected sale, the value of the château and estate of Amboise is put at the preposterously small figure of $12,000, which does not represent the cost of a tithe of the roofing, or of one of the huge sculptured mantlepieces which adorn some of the big halls and apartments. The Comte de Paris alone is known to have spent nearly a million francs in repairs and improvements, while in the reigns of King Louis Philippe and Napoleon III vast sums were devoted to the same purpose, the famous architects, Viollet-le-Duc, Champfleury, and others equally celebrated being employed to direct the work. In spite of all this, much remains to be done, and the Duc d'Aumale proposes to accomplish it out of his own purse.

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Incidentally a peep is accorded into the peculiar arrangements which the royal house of Bourbon-Orléans has been compelled to devise in order to meet the exigencies of the situation created by the frequency of the decrees of exile issued against them. When they were exiled in 1848, it may be remembered that all their estates were confiscated, Chantilly alone escaping from this sweeping measure — subsequently confirmed by Napoleon III — by the Duc d'Aumale having taken the precaution to assign the entire domain to Coutts's bank, in London, and in part, too, to Lady Burdett-Coutts. With a view of avoiding any such danger as this, the princes of the house of Orléans have now vested all their real-estate in the hands of a joint stock-company formed *ad hoc*, which owns even the very chapels containing the family tombs. The moment there is the slightest danger of confiscation, the shares of this concern are at once mortgaged or transferred to some bank, native or foreign, which, by becoming temporarily the proprietor thereof, prevents any possibility of forfeiture.

Even far more than Chantilly or Chambord is the Château d'Amboise, so superbly situated on a site overlooking the Loire, redolent with the historic memories of old France. It was there that Mary Stuart spent her honeymoon with her young French husband, François II. Leonardo da Vinci's body lies in the beautiful chapel at the corner of the castle court. Diane de Poitiers sought the shade of the magnificent trees of the matchless park which surrounds the château. It was at Amboise that Louis XI — the Louis of "*Quentin Durward*" — instituted the famous French order of St. Michel. The Emperor Charles V visited François I, of jovial memory, there. It was from its balconies that Queen Catherine de' Medici and her son, the King, watched the frightful massacre of the Huguenots, every spike of the railings along the terraces being adorned with a Protestant head, and the whole place reeking like a shambles. To Amboise, too, was conveyed, as a prisoner, the Surintendant Fouquet, after the marvellous chase and capture by D'Artagnan, whom all the readers of Alexander Dumas's "*Three Musketeers*" will remember; while, in more modern times, Abdel-Kader, the Algerian chief and hero, who so long resisted the conquest of his country, was detained as a State prisoner for several years, until he received his liberty on parole, and was permitted to establish himself at Damascus.

The Château d'Amboise stands high above the town, like another Acropolis above a smaller Athens. It rises upon the only height visible for a considerable distance, and gains more from the river than any of the other famous châteaux of the Loire. The magnificent round tower that springs from the end of the Charles VII façade completely commands the approaches of the bridge, as well as the little island in mid-stream, where King Clovis is said to have met Alaric before he overthrew the power of the Visigoths; and a superb effect of lofty masonry is produced by this building being erected on the summit of a hill, and by the carrying of the stone courses upward from the lower ground. It is a fitting gift from a great and noble prince to a great and glorious nation, especially appropriate when the uses to which it is destined are taken into consideration.

ARCHÆOLOGICAL EXPLORATION AT JERUSALEM.

IT is now more than a quarter of a century since Captain, now Major-General, Sir Charles Warren carried on his explorations at Jerusalem for the Palestine Exploration Fund, and which resulted in such brilliant discoveries, revealing to us what was then known as "Underground Jerusalem." That was the remains of the ancient city, now covered up with the accumulated *débris* of ages, an accumulation that reached, in some places, to a depth of more than seventy feet. Since that time, no systematic explorations have been carried on in the Holy City. Herr Baurath von Schick and other agents of the Palestine Exploration Fund have watched wherever any digging took place — for the foundation of new buildings or any other purposes — and, if anything of importance turned up, it has been faithfully reported in the *Quarterly Statement*, published by the Fund, and which is now the recognized journal of archæology in Palestine.

For some years back the value of ground at Jerusalem has been increasing, and building, more particularly on the north and west, has been going on outside the walls, and it became advisable to have some excavations made before houses were erected, which would make explorations impossible. The necessary firman from the Sultan was procured, and Dr. F. J. Bliss began operations last year. The first task he undertook was to trace the line of the ancient wall on the southern side of Jerusalem. It was known that the old wall was about eight hundred feet to the south of the present one, and that it skirted the brow of the slope which forms one side of the valley of Hinnom. Why the builders of the new wall left this commanding height undefended is a question that is not easily explained. It is certain that the older engineers did not leave this advantageous position for an enemy to occupy. Traces of the old wall were first come upon when levelling the ground for the English cemetery.

In 1874, Major Conder, writing from Jerusalem, recommended that explorations should be made at this point; and Mr. Henry Maudslay, at that time, did sufficient digging to show the existence of the wall all the way from the Protestant School to the east end of the cemetery. Among other things, he found that the dining-room of the school had its walls standing on the square base of one of the ancient towers; and that, in places, the rock on which the wall stood was scarped below to a depth of thirty feet. Mr. Bliss took up the work at the point where Mr. Maudslay had left off, and followed the line of wall from the cemetery, where it runs in a southeasterly direction for about two hundred and fifty feet. He also found deep scarps in the rock, which must have given great strength to the defence, and made the battlements to tower with an imposing appearance over the Hinnom Valley. The stones are of no great size, that is, in comparison with some of the masonry at other parts of the walls, such as that of the Jews' Wailing-place, and portions of the Haram Wall. They have the usual draught round their borders, and the lower course is bedded on the solid rock.

Water-supply had not been forgotten, as numerous cisterns have been come upon. The existence of a gateway was discovered at this point, and it is here that one interesting point in the present exploration presents itself. The main street of Jerusalem runs from north to south in almost a straight line — it begins at the Damascus Gate on the north and ends on the south at the Sion Gate, also known as the Bab an Nabi Daud, or Gate of the Prophet David. This is, do doubt, the original line of a thoroughfare that has existed from the earliest times, and it is assumed that there must have been a similar gate at the end of this main street in the older wall. This was one of the points Dr. Bliss was directed to discover. The gate which has been found is not exactly in the position where the expected gate was supposed to exist; it is a little too far to the west to be in a line with the main street. Still it ought to be borne in mind that the present Sion Gate is not quite at the end of that street, but a little to the west of it; this may indicate that some reason existed for the deviation in both cases. Here for the present judgment must be suspended, as the "spade" will in time settle the matter.

The point would have been cleared up by this time, but in tracing the wall eastward difficulties arose with some of the proprietors of fields on the subject of remuneration, and Dr. Bliss, merely as a strategical move in the negotiations, started his operations still farther to the east, where he picked up the line of the wall again near the Pool of Siloam. There he found the wall runs south of the old pool, and turns up in a northerly direction, and as the Hinnom valley here meets the Kedrom valley, it is assumed that the wall will continue northward till it joins the portion of the Ophel wall which Warren came upon during his operations; this will then connect it with the old wall of the Temple enclosure at the southeast corner. The Ophel wall is mentioned in 2 Chronicles 27: 3, where it is said Jotham "built the high gate of the house of the Lord, and the wall of Ophel he built much." It is also referred to in Nehemiah 3: 26-27: "Moreover the Nethinims dwelt in Ophel, unto the place over against the water-gate towards the east, and the tower that lieth out. After them the Tekoites repaired another piece, over against the great tower that lieth out, even unto the wall of Ophel."

Close to the corner, where the newly discovered wall turns northward, another gate has been found. As four or five courses of the draughted masonry still exist, the details of this gate can be well made out. Its date may be also determined to within a few years, for Josephus says that at his time Siloam was outside the walls; but Antonius, a martyr, who wrote about 750 A. D., states that "The mountain of Siloa is at the present day within the walls of the city, because the Empress Eudocia herself added these walls to the city." This makes it evident that the portion of the wall with its gate Dr. Bliss has brought to light at Siloam was that built by this Empress, and its erection may be dated as having taken place within a year or two of the middle of the fifth century. The remains of the older wall that existed in the time of Josephus are, no doubt, still under ground, and will require to be sought for in order to make the exploration complete at this locality. — *London Daily News.*

ASPHALTS AND BITUMENS.[1]

TO define in sufficiently broad, but exact terms, the proper use of the word asphalt, we must first refer to the meaning of the other term which I have used in choosing a subject for this lecture, viz, *bitumen*. The word bitumen in mineralogy is applied to hydrocarbon mixtures of mineral occurrence, whether solid, liquid or gaseous. With this understanding of the nature of bitumen, we can adopt the very concise classification of Prof. S. F. Peckham, who published, in 1885, the "Special Report on Petroleum" for the tenth census. It divides bitumens into:

Solid: Asphaltum (German, *Asphalt* or *Erdpech*; French, *Asphalte*). *Semi-fluid: Maltha* (French, *Gondron minéral*; Spanish, *Brea*). *Fluid:* Petroleum. *Volatile:* Naphtha (German, *Naphta*). *Gaseous:* Natural Gas — of burning springs.

According to this classification asphaltum is simply a solid bitumen. It may be almost pure, as the so-called "Glance-pitch," Gilsonite, or Grahamite, and find its chief application in asphalt varnish-making; or, it may contain earthy matter, varying in amount from two to three per cent to the ninety per cent of the so-called asphalt rocks. . . .

In this country mineral tar or maltha is found in a large number of States, especially in the West. The most important occurrences are those of southern California, in the counties of Kern, Ventura

[1] Extracts from a lecture by Samuel P. Sadtler, Ph. D., delivered before the Mineralogical Section of the Brooklyn Institute and published in the *Journal* of the Franklin Institute.

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and Santa Barbara. Crude maltha or mineral tar, as found in California, is often mistaken for a heavy petroleum, or rather a petroleum residuum, as its gravity, 12° to 17° Baumé, corresponds with that obtained in such residuums; but, as pointed out by Professor Peckham, it differs in important particulars. The maltha in its crude state contains from twelve to fifteen per cent of water, which will not settle out, but must be removed by heating to from 212° to 300° Fahr. The amount of water retained by crude petroleums, incapable of settling out, on the other hand, is slight, not over one to two per cent. The crude maltha usually contains air, carbon dioxide, or hydrogen sulphide, in varying proportions, mechanically mixed with the viscous mass, so that when the maltha is heated to not more than 100° Fahr., it begins to froth rapidly, and will usually fill both still, condenser and receiver with an overflow of foam before any of the water has been removed.

These malthas, likewise, contain, in the natural state, volatile oils and basic hydrocarbons, both of which have to be removed in the refining process.

Similar to this occurrence of natural malthas, although distinct from them, in respect of the conditions required for its extraction and possibly also in chemical characters, is the so-called "liquid asphalt" obtained at Las Conchas mine, some thirteen miles east of the City of Santa Barbara, in Santa Barbara County, Cal. Here is found a bed of clean sea-sand, holding, like a sponge, the thick maltha, which oozes up from underlying beds of shale.

It is stated that a well sunk 400 feet in this lower stratum continues to ooze maltha at all points. The mine is right on the edge of the ocean, and the sands extend some miles back from the beach. Covering the sand deposit is a surface deposit of light earth and soil, upon which is ordinary vegetation. This soil is "hydraulicked" off by a twelve-inch stream of clear salt-water, and the maltha-containing sand uncovered. The separation of the maltha from the sand is accomplished not by distillation, but by mechanical means, and with the aid of specially designed machinery, by the California Petroleum and Asphalt Company, which sells it under the name of "Alcatraz liquid asphalt."

Crude maltha, under the several names of "liquid asphalt" and "mineral tar," is found also in Utah, Kentucky, Tennessee and Texas, although in most cases, no attempt has been made to utilize these products commercially.

Let us pass now to solid bitumens or asphalts in the proper sense of the word. The purest of the solid bitumens are known sometimes as "glance-pitch" or "gum asphaltum." Prominent among them is the gilsonite of Utah. This is found in the Uintah Indian reservation in Wasatch and Uintah Counties. The purity of the gilsonite (some ninety to ninety-eight per cent soluble in carbon disulphide) is such that it finds large application in the manufacture of varnishes and insulating compounds. The present production is some 2,000 tons annually. Glance-pitch also occurs in Texas, in Cuba and Mexico.

We come, then, to the asphalts which contain inorganic matter in varying amount as a uniform constituent of the mineral as it occurs in nature.

The two most important occurrences of these asphalts are those of the Island of Trinidad, known as the Trinidad Lake asphalt, and of the Province of Bermudez, in Venezuela, on the mainland, nearly opposite the Island of Trinidad, and known as the Bermudez Lake asphalt.

The so-called "Pitch Lake" of Trinidad occurs on the west coast of the island. It is situated about a mile and a half from the sea-coast, at a height of 138 feet above sea-level, and occupies the crater of an old mud volcano. It forms, therefore, a circular mass of asphalt of an area of a little more than 114 acres, and of uncertain depth. Rude borings have been made which indicate a depth of 78 feet in the centre and about 18 feet at the sides. If these figures are correct, the lake should contain about 6,000,000 tons of asphalt. Too much confidence, however, cannot be placed upon these borings, as the asphalt near the centre seems to be softer than that around the edges and seems to rise readily to replace the portions removed. Whether the lake or deposit of asphalt is still fed from underground sources, as has been suggested by some authors, is not definitely known. While the term lake is used, it must not be supposed that the surface resembles that of a liquid, even a viscid liquid. On the contrary, the surface shows a brownish, earthy material, with cracks or fissures here and there of a width and depth of several feet, some filled with rain-water, and some with earth, supporting a scrubby vegetation. Carts and mules, it is stated, can be driven everywhere on the surface. The material is dug with pick and shovel, loaded into carts and hauled to the beach to be loaded on lighters which carry it to the vessels. During the voyage to this country, the material unites into a solid mass, and must be removed from the hold by the use of the pick and shovel.

The crude Trinidad Lake asphalt has the following composition:

Bitumen	39.83	per cent.
Earthy matter	33 99	"
Vegetable matter	9.31	"
Water	16.87	"
	100.00	"

After a refining process, in which it is heated in large tanks to a temperature of not much over 300° Fahr., in order to drive off the water and allow portions of the earthy matter to settle and of the vegetable matter to be skimmed off, it has the following composition:

Bitumen (by CS_2)	59.86	per cent.
Earthy matter	35.82	"
Vegetable matter	4.32	"
	100.00	"

Besides this lake asphalt, the Island of Trinidad also yields a "land asphalt," from the neighborhood of the lake.

This asphalt may have come from overflows of the main deposit in past ages, or it may have an independent, although analogous, origin. It seems harder and more earthy than the lake deposit, and its bitumen shows differences in solubility and other physical properties.

The exportations of the Trinidad Lake asphalt have increased rapidly in recent years, and amounted in 1892 to 96,319 tons, and in 1893 to 88,881 tons.

The Bermudez asphalt also comes from a so-called "pitch lake," situated in the State of Bermudez, in the republic of Venezuela. The deposit is some eighteen miles from the mouth of the San Juan River, which empties into the Gulf of Paria, opposite to, and about one hundred miles distant from, the Island of Trinidad. A narrow-gauge railroad runs from the shipping-point, Guanoco, on the San Juan River, to the lake, a distance of six miles. The deposit, or lake, covers an area of over 1,000 acres, and is of unknown depth. While vegetation is found growing in irregular patches over the surfaces, it is only superficial, and a uniform deposit of asphalt is found underneath.

The Bermudez asphalt, as dug from the lake, is a solid bitumen of great purity, containing, according to an analysis recently made, but 2.63 per cent of mineral matter and about 1.3 per cent of organic non-bitumen, with several per cent of water, leaving over 90 per cent of bitumen soluble in carbon disulphide.

The refined asphalt, obtained by a process similar to that spoken of under Trinidad asphalt, is slightly purer, being:

Bitumen (by CS_2)	97.22	per cent.
Mineral matter	1.50	"
Organic non-bitumen	1.28	"
	100.00	"

This asphalt is, of course, notably softer and more plastic than the Trinidad Lake asphalt, which in its refined state carries some 35 per cent of mineral matter (chiefly clay and oxide of iron) as compared with 1.50 per cent of the Bermudez.

The natural asphalts (or solid bitumens) of California are also very important and of a high degree of purity. Thus, the La Patera mine, situated twelve miles west of Santa Barbara, and at a depth of 125 feet, yields a compact solid rock of the composition:

Bitumen soluble in CS_2	59.15	per cent.
Mineral matter	39.75	"
Organic non-bitumen	1.10	"
	100.00	"

The deposit covers several hundred acres, and is mined much in the same manner as coal. It is not soft, but is friable, and breaks readily under the pick or wedge. The mineral residue is fine silica, free from clay and organic matter.

Similarly in Kern County, California, are extensive deposits of a solid asphaltum worked by the Standard Asphalt Company. This material in its crude state shows the following composition:

Bitumen soluble in CS_2	84.79	per cent.
Mineral matter	8.70	"
Organic non-bitumen	traces.	
Moisture	6.51	"
	100.00	"

An interesting feature in connection with this asphalt is that the mineral matter consists almost entirely of infusorial earth, or silica of organic origin, possessing a peculiar absorbent character.

Other asphalts of this class, that is, solid mixtures of bitumen and earthy material, are those of Cuba containing some seventy per cent of bitumen, and of Syria containing from seventy-five to ninety per cent of bitumen.

We have now to consider the case of bituminous or bitumen-saturated rocks. These are included in two classes: Bituminous limestones and bituminous sandstones. The former class includes the best known and most generally used asphalts of Europe. We have among these the mines at Seyssel-Pyrimont in the Department of Ain, France; those of Val de Travers in the Canton of Neufchatel, Switzerland; those of Ragusa in the Island of Sicily; of Limmer, near Hanover, Germany; and of Vorwohle, in Germany. These asphalts are in general composed of a fine amorphous limestone, saturated with from five to fourteen per cent of bitumen. The subjoined analyses, taken in part from Howard's pamphlet and in part from the "Mineral Resources of the United States for 1893," will show the composition of these asphalts:

	Seyssel, France.	Val de Travers, Switzerland.	Ragusa, Sicily.	Limmer, Germany.	Vorwohle, Germany.
Bitumen	8.15	10.15	8.92	14.30	5.37
Calcium carbonate	91.30	88.40	88.21	67.00	90.80
Magnesium carbonate.	.10	.30	.96	—	—
Clay and oxide of iron.	.15	.25	.91	17.52	.59
Sand	—	—	.60	—	2.55
Insoluble	.10	.45	—	—	—
Loss	.20	.45	.40	1.18	.34
	100.00	100.00	100.00	100.00	100.00

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One very characteristic occurrence of bituminous limestone is found in the United States, viz, the so-called litho-carbon in Uvalde County, Texas. The mineral here found, according to "Mineral Resources of the United States for 1893," is a bituminous limestone, the limestone being a shell deposit, in which the original forms are still maintained. The rock contains from fifteen to thirty-three per cent of bitumen, the average being about twenty per cent. The refined product is said to possess peculiar properties, being especially noted for its elasticity, making it, in this respect, somewhat similar in character to elaterite.

In this country the bituminous sandstones occur chiefly in California, Utah and Kentucky. In the State first named, these sandstones are found at various points between San Francisco and Los Angeles, in the counties of Santa Cruz, San Luis Obispo, Santa Barbara and Ventura. They contain from twelve to eighteen per cent of bitumen and are easily pulverized when heated. They are used in most cases without other admixture for street-paving, being rolled or tamped thoroughly while hot. Similar products are obtained from Utah and Kentucky, although that from Utah is often too rich in bitumen to be used for paving purposes without farther dilution with sand.

The production of asphaltum and bituminous rock in the United States for 1893 is given by the United States Geological Survey in "Mineral Resources of the United States for 1893," as 47,779 tons, of which California produced 42,650 tons, Utah 3,200 tons, and Kentucky 1,929 tons. For 1892 the production is given as 87,680 tons. . . .

There remains the practical side of the subject to be noted.

The uses of asphalt may be summarized as follows:

1. As a varnish or paint.
2. As the base of insulating compositions.
3. As a waterproofing material.
4. As a cement in ordinary building construction.
5. As the cement in roofing and paving compositions.

(It is stated that fully ninety-five per cent of the asphalt used is for the last-named purpose.)

For the manufacture of asphalt varnish or paint, the asphalts rich in bitumen (like gilsonite) are used, the bitumen being partly dissolved by admixture with oil of turpentine and linseed oil. In this way a so-called Japan varnish is obtained for the process of japanning metals. The asphalt varnish may also have other resins (like shellac) added in order to give greater flexibility and toughness.

For the manufacture of insulating compounds the asphalt is usually tempered with wax tailings and other petroleum products to give the mixture the proper consistency; the exact composition of the mixtures being, however, carefully kept secret by the manufacturers.

For waterproofing the foundations of buildings, and as a protection against moisture in cellars, etc., a refined maltha or melted asphaltum is often used, being painted on the masonry or timber, or bricks are dipped in it before being set in position. For lining reservoirs, irrigating canals and ditches, an asphalt cement similar to that used for paving is frequently used. In this case, as has been shown in practice, a natural asphalt with a proper proportion of bitumen and mineral matter or a natural asphalt tempered with a maltha or so-called "liquid asphalt," will yield a more homogeneous and water-resisting coating material than an asphalt tempered with either coal-tar or petroleum residuums.

For other forms of construction, especially for paving sidewalks, stable-yards, open areas and flooring in exposed positions, as upon flat enclosed roofs of large buildings, asphalt mastic is used. The basis of this is usually one of the natural asphaltic limestones, such as Seyssel or Neufchatel asphalt.

The rock, having been powdered, is put in round kettles in which about eight per cent of its weight of refined Trinidad asphalt has been previously melted. It is thoroughly mixed with this at about 280° Fahr. for several hours, and is then run into moulds, where it is formed into square, hexagonal or round blocks, of about fifty to sixty pounds weight. When the mastic is to be used, it is again melted with refined Trinidad asphalt, in the proportions of about seven pounds of asphalt to one hundred pounds of the mastic, and sand or fine gravel is added gradually up to sixty pounds, according to the use to which the mixture is to be put. This mixture, known as "gritted mastic," is spread while hot, rubbed smooth and allowed to cool. When cold it is slightly pliable and thoroughly waterproof.

The last-named application of asphalt, viz, for roofing and paving construction, as before stated, is by far the most important of all the others. As applied to roadway or street paving, we have two entirely distinct methods to note. The asphaltic limestones such as are found in Europe, and asphaltic sandstone such as is found in California, require merely to be crushed, heated to from 275° to 300° Fahr., and hauled to the streets and spread uniformly while still hot. It is then tamped and rolled with hot instruments. Asphalt pavements of this kind are in general use in Paris, London, Berlin and other European cities. Roadways made from bituminous limestone are said to become polished by wear and to become slippery in foggy and drizzling weather. In California, where bituminous sandstone is used, they are said to wear well, except that they soften rather too much in warm weather.

The other form of asphalt paving construction, used most largely in this country, is that in which an asphalt cement is first made by taking a hard but relatively pure asphalt and tempering it with some oily or bituminous liquid. This cement, in the proportion of ten to sixteen parts, is then mixed at a temperature of about 300° Fahr. with from eighty-four to ninety parts of clean sand and powdered limestone, and the mixture applied with no more loss of heat than necessarily follows its transportation to the streets in covered carts.

While this general statement as to the nature of an asphalt paving composition may be taken as covering the subject broadly, many points of the greatest importance come in to determine whether a given composition will be a satisfactory one or otherwise. The asphalt should be one with a high percentage of so-called petrolene as compared with asphaltene; the oily or bituminous liquid above referred to should be one that will make a satisfactory and durable blending with the asphalt, and the proportions of tempering liquid and asphalt which go to make up the cement should be chosen with reference to climate and the character of the traffic that is likely to pass over the street.

The analyses quoted in this lecture will show how asphalts may differ in the first respect. With regard to the nature of the tempering liquid, I may say that coal tar was at one time used, but has been almost universally rejected, as not making a satisfactory or durable blending material, the mixture having been found to disintegrate under atmospheric influences. Petroleum residuums are now almost universally used in the Eastern States, while malthas, or natural "liquid asphalts," so-called, are used on the Pacific Coast and in Western States. I am satisfied, on both theoretical and experimental grounds,[1] that the last-named tempering materials are to be preferred.

SOCIETIES

AMERICAN INSTITUTE OF ARCHITECTS: AMENDMENTS TO THE BY-LAWS.

THE following Amendments to the By-Laws will come before the Annual Convention, to be holden in St. Louis, October 15–17, 1895, for discussion and action thereon, and are hereby published in accordance with the provisions of Article XI, for the information of the Fellows of the Institute.

It is proposed by the Committee appointed at the last annual Convention on Proportionate Representation of Chapters in the Board of Directors:

That Article III of the By-Laws be changed by inserting in the first line the words "Section 1," and that the following paragraphs may be inserted at the end of the Section 1, *i. e.*, after the word "qualify":

SEC. 2. There shall be a Nominating Committee, consisting of one duly accredited Fellow as representative from each Chapter having a membership of at least six Fellows.

SEC. 3. The place and hour of meeting of the Nominating Committee shall be announced by the Chair at the first session of the Convention; such announcement shall give at least twenty-four hours' notice of the meeting.

SEC. 4. A member of the Committee unable to attend the meeting may be represented by proxy, providing the proxy is a member of the same Chapter. Any Chapter not properly represented at a meeting will lose its vote in the Nominating Committee.

SEC. 5. Five members will constitute a quorum of the Committee at the meeting. If such number be not present, then the Nominating Committee shall lose the right to nominate and the matter of nominations shall go over to the Convention at large.

SEC. 6. It shall be the duty of the Nominating Committee to make nominations for all of the officers and Directors to be elected at the Convention; and, if possible, to furnish printed ballots containing such names to each member attending the Convention.

The ballots furnished by this Committee shall be announced as the regular ballots.

It is also proposed by the President that:

In Article I, Section 2, second line; in the form of application under the same section; in the ninth, fifteenth and twenty-second lines on the sixth page; in section 3, eighth and ninth lines; in section 4, second line; in section 5, second line; in Article II, fifth and seventh lines; in Article IV, section 1, tenth line; in Article V, section 2, third, fifth and sixth lines; in Article VI, section 1, fourth and seventh lines; in section 2, last line; in section 3, second line; in Article VII, section 5, fourth line; in Article X, section 1, sixth and seventh lines, respectively, — or wherever else they may occur, the words "Board of Directors" shall be stricken out and the words "Executive Committee" shall be substituted therefor.

In Article I, Section 2, on page 6, strike out in the fifteenth line the words "at its first session," and in the sixteenth line strike out the words "and publish," so that this portion of the By-Laws shall read:

The Executive Committee shall, under these By-Laws, formulate rules for the conduct of a letter-ballot, etc.

In Article I, Section 5, seventh line, the word "Board" shall be stricken out and the words "Executive Committee" shall be substituted therefor.

In Article VIII. — Strike out the title and the whole of Section 1, and substitute therefor the title "Executive Committee," and the

[1] *Paving and Municipal Engineering*, September, 1894, p. 118.

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whole of Section 1, Article IX, with the addition after the word "three" in the fourth line, of the words, "and the other four shall be elected at each annual convention to serve for one year or until their successors are elected and qualify," so that it shall read as follows:

ARTICLE VIII.

EXECUTIVE COMMITTEE.

Section 1. *The Executive Committee shall consist of seven Fellows, of whom the President, Secretary and Treasurer of the Institute shall be three; and the other four shall be elected at each annual convention, to serve for one year or until their successors are elected and qualify.*

In Article VIII, Section 2, strike out the whole of the first line, the words, "shall be as follows" in the second line, and the word "Directors" in the third line, and substitute therefor the words "Executive Committee"; so that the first two lines shall read as follows:

Sec. 2. *In the interim between the conventions of the Institute, the Executive Committee shall be the custodians, etc.*

In Article VIII, Section 2, strike out the whole of the first line on the thirteenth page and substitute therefor the words: "The Executive Committee shall hold at least four"; strike out the last three words of the fifth line and the whole of the sixth, seventh and eighth lines and the first three words of the ninth line, making the paragraph read as follows:

The Executive Committee shall hold at least four meetings in each year, one within ten days after the beginning of its term of office, and another within thirty days before the regular annual convention of the Institute, and at the last mentioned meeting it shall receive and act upon the reports of officers, of Chapters, and of standing and of special committees, and shall prepare its annual report to the convention.

In Section 3, first line, strike out "Board of Directors," and substitute "Executive Committee," and also strike out all after the word "responsibilities," to the end of the section, and add thereto the words: "and shall have power to delegate especial work to the committees of the Institute or to the committees appointed by itself for the purpose," making the Section read:

The Executive Committee shall also, from time to time, formulate and publish for the information of the Institute such rules and regulations as it may deem expedient and necessary to establish for the furtherance of the discharge of its duties and responsibilities, and shall have power to delegate especial work to committees of the Institute or to committees appointed by itself for the purpose.

In Article IX, the words "Executive Committee and" shall be stricken out of the title, and Section 1 shall be transferred, as heretofore proposed, to Section 8, and the words "Sec. 2" shall be stricken out.

In Article X, Section 2, strike out the last two words of the first line and the entire second and third lines, also the last two words of the seventh line and the entire eighth and ninth lines, so that it shall read as follows:

Sec. 2. *A practising architect may apply, in the manner heretofore prescribed, and become a Fellow of the Institute without first becoming a member of any Chapter and being approved by the officers of the same.*

Section 3 shall be stricken out.
Section 4 shall be stricken out.
Section 5 shall be stricken out.

In Section 6 and at the end of the same the following words shall be added "*but nothing herein contained shall prevent the Executive Committee from granting charters to two Chapters occupying the same territory in whole or in part.*"

In Section 7, strike out all after the words "new Chapter," in the sixth and seventh lines, through "provided further" in the tenth line, and substituting therefor the words 'provided however," making the section read as follows:

Sec. 7. *New Chapters. Any six practising architects eligible to membership in the Institute may apply to the Institute for membership and for a charter to organize a new Chapter, stating its proposed limits, and the Institute may elect such new members and charter such new Chapter, provided however that if the new Chapter proposes to take part of the territory of any existing Chapter, such existing Chapter shall be consulted by the Institute before such charter shall be granted.*

In Section 10, next to the last line, strike out the words "as such."

[Attest] ALFRED STONE, *Secretary A. I. A.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

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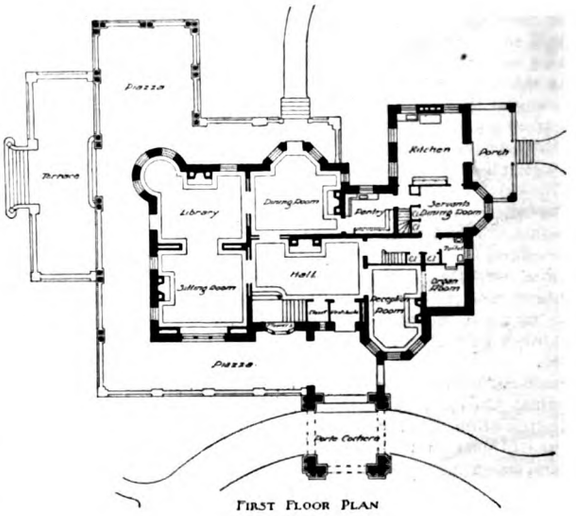
[Gelatine Print issued with the International and Imperial Editions only.]

NEW "CENTRAL" SCHOOL-BUILDING, YORK, PA. MR. B. F. WILLIS, ARCHITECT, YORK, PA.

THIS eight-room school building is now in course of erection in the central part of the city. The site is such that the shaded rear portion cannot be seen from the street, hence the more economical design and materials for this part of the building. The basement story is 6 feet, 6 inches above pavement-line, and is made, together with all other cut-stone details, of cream-buff Indiana limestone starting from Woodstock granite sill-course; outside steps and door-sills are also Woodstock granite. All cornices, pediments, etc., terra-cotta, to match in shade the cut limestone parts. Roof metal-work and conductors, cold-rolled copper. All roofs are covered with Peachbottom slate. All interior partitions, brick. The stairs are open "mill-construction," 2-inch plank treads, 1½-inch plank risers, all housed into 3-inch plank strings. All floors are double, upper floors maple, 2-inch face, special machine worked; all other interior wood-finish red-oak, common sawed; polished American plate-glass in all windows of 3-story portion. Each school-room washstand is fitted with a drinking-fountain attachment that dispenses with the use of cup or drinking-vessel of any kind. The heating and ventilation plant consists of five vertical-pot, warm-air furnaces. The water-closets for the pupils are in the basement connected with street sewer by flushing-trough fitted with automatic flush; all basement floors are concreted. The entire cost of the building, including architect's services, ready for use, is, exclusive of school desk-furniture and lighting-fixtures, $27,431.66. Contractor's time-limit for completing the building is eight months.

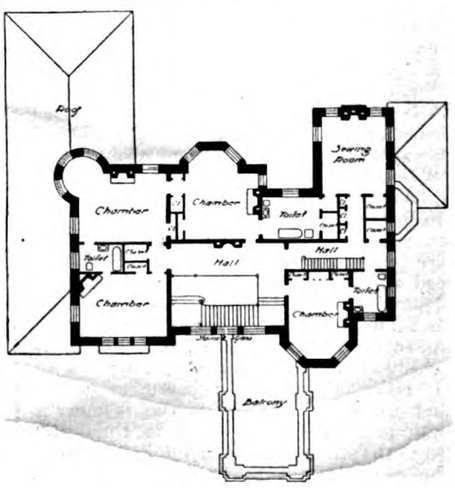
HOUSE OF CYRUS H. K. CURTIS, ESQ., WYNCOTE, PA. MESSRS. BAILY & TRUSCOTT, ARCHITECTS, PHILADELPHIA, PA.

THE building is entirely fireproof, including an iron roof. The floors are iron beams and terra-cotta arches, the outside walls being furred with hollow porous brick, the four-inch partitions in the



FIRST FLOOR PLAN

building being "Mackite." The exterior walls are built of brick, faced with four-inch Indiana limestone on all sides of the building, the *porte-cochère* and columns of the porch being of the same material. The terrace is supported on iron beams and cemented. The roof will be of red slate with copper finials and flashings. The slate is fastened to two-and-one-half-inch porous rough blocks. The interior plastering throughout is to be hard Eureka. All the mill-work, exterior and interior of first and second floor will be cherry and mahogany in the main rooms of the latter. The floors will be oak; the first story parquetry. The plumbing goods all come from the J. L. Mott Iron Works, New York. The heating is "Indirect Hot Water," the Mercer boiler being used; no hot-water pipes except the one from pressure-tanks run above the first floor. The cold-air ducts all run under the cellar floor, so that the full height of the cellar is retained. The building is also supplied with electricity and burglar alarms. The cost of the building will be about $75,000.



SECOND FLOOR PLAN

Green-houses and a stable will also be erected.

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THE "GARFIELD" SCHOOL-HOUSE, YORK, PA. MR. B. F. WILLIS, ARCHITECT, YORK, PA.

THIS twelve class-room building is now being built on the outskirts of the city, and in the centre of a plot of ground, 200′ x 220′, bounded by streets on three sides. The basement story is native dark-blue limestone, rock-face finish, pointed with Alsen cement, natural color; from this point up, all walls including principal cornices are constructed of selected red common native brick, laid with brown-mortar joint. Cornice at second story, principal entrance projection, brown terra-cotta. Pennsylvania brownstone for all cut-stone work in brick walls. Roof metal-work, including conductors, cold-rolled copper. American polished plate-glass throughout. Building is warmed and ventilated by six horizontal furnaces of large radiating capacity. All roofs are covered with Peachbottom slate. All interior partitions, brick. The first story is isolated from story above by self-closing doors which open into stair-halls; this feature was adopted in a ten class-room building built in this city from the author's designs, four years ago, and, aside from lessened fire-risk, has proved very satisfactory in added quietness during time schools are in session. It will be apparent to all that the isolated stories are obtained at the expense of staircase effects on the first floor, but the ends gained seem to the author to justify the means in a school building of this character and moderate cost. All floors are double, upper floors, maple, 2-inch face; all other interior woodwork, selected common-sawed red-oak; the stairs are open "mill-construction," 2-inch plank treads, 1½-inch plank risers, all housed into 3-inch plank strings. Each school-room washstand is provided with a drinking-fountain attachment which does away with the use of cup or drinking vessel of any kind. The contractor's time-limit for completing the building is 11 months. The entire cost of the structure, less school-desks and lighting-fixtures, is as follows: Basement excavation and rough-stone walls, $1,993.60; superstructure contract, $25,336; heating and ventilation, $3,100; architect's services, $1,521.48; making a total of $31,951.08.

DOORWAYS AT FAIRHAVEN AND AT ACUSHNET, MASS.

STUDIES IN SKETCHING.

[Additional Illustrations in the International Edition.]

SALON IN THE HOTEL OF THE COMTESSE DE J——, AVENUE D'IENA, PARIS, FRANCE. M. GUSTAVE RIVES, ARCHITECT.

[Copper-plate Photogravure.]

VESTIBULE OF THE SAME HOTEL.

[Copper-plate Photogravure.]

THOMAS STREET, GROSVENOR SQUARE, W., LONDON, ENG. MR. W. D. CARÖE, ARCHITECT.

LADY CHARLES SPENCER, AFTER A PAINTING BY SIR JOSHUA REYNOLDS.

THE publication of an illustration from one of Sir Joshua Reynolds's most characteristic portraits affords us an opportunity to consider the life of a man who must always be reckoned among the worthies of England. Reynolds can never be so well known to posterity as his friend Samuel Johnson, for he was not fortunate in finding a Boswell to whom it would be delightful to record every one of his observations in the painting-room about art and artists, and to whom the commonest occurrences in the house in Leicester Square would be more important than any State business in Europe. Still, Reynolds has fared better than the majority of his contemporaries, or than English artists in general. He is as much of a reality to us as any of Fielding's or Goldsmith's characters. We can trace his career from the time when, as a child, he produced drawings "out of pure idleness" in the Plympton parsonage, until the summer day when his eyesight suddenly failed, and, as if he heard the command of destiny, meekly abjured the magic which had wrought so many wonders. . . . Reynolds, as every one knows, was born in 1723 at Plympton. Devonshire offered unlimited scenes for the inspiration of landscapists, and there were enough of men, women and children to serve as models for embryo figure painters and sculptors. But by one of the inexplicable perversities of human nature young artists seldom or never begin with attempts to represent created forms. . . . Joshua Reynolds was allowed to follow his own system of self-education until he was eighteen. It was no easy matter to determine what was to be done with a youth who was out of place in Devonshire, and was supposed to be as ill-adapted for any other part of England. That an admirer of the great Italian was sent as a pupil to Hudson in London was evidence that his advisers knew little about art. He was, however, a son-in-law of Richardson, who wrote the "Treatise on Painting." The master was puzzled what to do with a youth who gave pre-eminence to Raphael, and he set him to copy drawings or prints after Guercino. But Reynolds was not to be cheated. He tried his hand at portraits, and he was declared to be so successful with one of a servant of Hudson's that the master rose up against the rebellious pupil, and sent him adrift. Reynolds returned to Devonshire, and with the experience he gained during his two years in London he painted portraits, and it is believed that the most important were reminiscent of the Hudsonian manner. . . . He was twenty-six when the appointment of Commodore Keppel, who was one of his early patrons, to the Mediterranean station enabled Reynolds to obtain a free passage to the Italian coast, from whence he could visit Rome. There he was able to make the masterpieces yield secrets to him which were unknown in Devonshire as in London; but more important still, he was disillusionized by them. . . . When he reappeared in London and set up a studio at the end of 1752, it was not to be expected that he was to be welcomed by the painters. His style was novel, and therefore was likely to attract commissions. Hudson declared that Reynolds did not paint so well as formerly; Ellis found his works to be altogether unlike Kneller's. Reynolds for a time was successful, and then he had to make way for Liotard, the Swiss, who was not superior to Hudson or Ellis. But fortune is whimsical, and in a short time Reynolds was again in favor. He did not exactly imitate John Gay's painter, and employ casts of a god and goddess as the normal types for his sitters. But, as Northcote said, every woman who wished to descend to posterity as an angel, and every man who wished to be accepted as a hero or a philosopher found their way to Reynolds's studio. Three years after his return to London he had increased his price for a head from five to twelve and then to twenty guineas. It was not long before he could say his time was worth five guineas an hour, or one-tenth of the value of an hour to a loquacious Parliamentary counsel in our time. As time went on, Reynolds charged more for the portraits, but if quality be considered, his works were always cheap.

THE ANGLICAN COLLEGE, JERUSALEM.

THE drawing from which this illustration was produced was exhibited this year at the Royal Academy. The architect, Mr. George Jeffery, belongs to the Public Works Department, Cairo.

CHICHESTER CATHEDRAL, ENG.

IT would be interesting to discover why Chichester Cathedral is so little prized, but in public estimation there is hardly another which stands lower. The obnoxious fee system may be one of the causes, and the peculiar perfunctoriness of the services a second. Yet the building is not without interest, for besides the architecture the sculptor's art from Saxon times to Flaxman's is represented in the monuments. There are wall-paintings of a sham mediæval sort, which give pain to all who see them. It is a pity some of the whitewash which was used elsewhere was not applied to them. Mr. Hanson has selected the most favorable point-of-view for his representation, for it enabled him to introduce the campanile commonly known as Ryman's Tower. An etching of the cathedral by Mr. Hanson will shortly be published.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

A CHANCE TO VISIT THE ATLANTA EXHIBITION.

PROVIDENCE, R. I., September 12, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — It having been suggested that the Eastern members of the American Institute of Architects would like to make their return trip from the St. Louis Convention by way of Atlanta, "so as to enjoy the Cotton States and International Exhibition, which will then be in full force, and that a day spent among the exhibits, particularly from South America and Mexico, will afford more information than could be obtained by a good many months of travel South," I have endeavored to ascertain whether satisfactory arrangements could be made with the railroad companies and tickets could be obtained to cover a return trip through Atlanta.

If a party of fifty can be secured, it is probable that reduced fares covering the entire trip can be obtained, but it will be useless to undertake to get reduced rates unless that number can be guaranteed.

Will you, through the columns of your journal, ask the members of the Institute who intend to go to St. Louis and would like to return through Atlanta to communicate with me as soon as possible, in order that I may know how many there are who would like to avail themselves of the opportunity to attend the Convention and the Southern Exposition? Yours truly,

ALFRED STONE, *Secretary A. I. A.*

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A SEEMINGLY SIMPLE CASE.

Cambridge, Mass., September 12, 1895.

To the Editors of the American Architect: —

Dear Sirs, — Will you be so kind as to advise me what to do in the following, rather unusal, case:

A and B are brothers, joint owners of large real-estate interests, in this and other cities. C is a local real-estate agent, who handles the local business of A and B. D is a man employed by A and B as a salesman or clerk in a wholesale house in Boston.

Early last spring A and C came to my office to consult with me regarding plans for a large one-story structure for stores and other purposes, which they proposed to erect on a lot of land at the corner of two streets near by. They had a general idea of what they wanted and asked me to make a sketch-plan, which was satisfactory, and I was ordered to make plans, etc. After we had been at work a few days on the plans C came in and wanted me to add a second story over a part of the building, making a large hall, 50′ x 70′, with ante-rooms, also quarters for a cycle club. This necessitated a change in the plans, which was made, and I sent the revised plans to A and B by C, their agent. He came back the following day with the plans and the word that they were all right, and that I was to go ahead and get out the plans and specifications as quickly as possible and as the building was only a temporary structure, to make it as inexpensive as possible. C also said that A and B told him to ask me what my charges would be for the work. I said that as it was so near the office (only 150 feet) and as I was a tenant of A and B I would charge only 4 per cent on the total cost, except that, if they should want to give the contract to a certain mason who had done some work, that I had charge of, for them before, I should charge the regular rate of 5 per cent as the man in question was very incompetent and required much more care and attention than regular contractors. C told A and B what I had said, and the following day A came to my office and said he did not think it fair that I should charge more if one person did the work than another, and that he did not want the objectionable man to have the contract if he were not the lowest bidder. I then told him that in that case I should make the same charges *i. e.*, 4 per cent, which he said was all right, and requested me to make all possible speed with the plans and have them ready for estimates by a certain date, as the prospective tenants wanted the building as early as possible.

I at once put on all force and had the plans nearly done, when C and D came into the office one day and told me that A and B had gone South for an indefinite period, and that they had given D full power to act for them in their absence. D showed me a letter to that effect from A and B. D wanted the plans and specifications as early as possible and I had them done on time and ready for estimates.

While the estimates were being made, D wrote me that he wanted me to make the framing-plans, as he wanted to let the contracts as soon as possible after the bids were in.

My usual method is to ask for sealed bids to be delivered at the office at a certain date, to be opened by myself, or in the presence of the owner. In this case I did not get the estimates at all, as D wanted me to send him the sealed estimates as fast as I got them, a thing which I flatly refused to do, but told him that he could get the estimates if that was the way he wanted to do. So I sent him plans and specifications, although several contractors did estimate in the office, but sent their bids to D.

About two weeks after the bids were in, D came in my office and said that the bids were higher than he expected, and that in the absence of A and B he would not go on with the work. I told him that I thought the lowest bids were all right, ($18,000 — area of building, 12,000 square feet) and that it would be impossible to build a structure that size for less, as I had estimated the cost from $18,000 to $20,000. He said that he would wait for the return of A and B, in a short time.

The last of May, A and B returned, and D came to see me and said that they had decided not to build and wanted me to name a lump sum for my services. I told him what my agreement with A, B and C was, and that for what I had done I should get 3 per cent. He said that this would not be considered as it was too high; he had brought $100 with which to pay me, and said that they would not pay me any more. I told him that I would not take less than 3 per cent on the estimate, when he said that he had an estimate of $10,500, which I told him was no good, and that $17,500 or $18,000 was a very low estimate. I had the figures of several reputable builders who had estimated, none lower than $17,500. On the next day D called and offered me $150 to settle, which I told him was impossible for me to consider, and that I should have 3 per cent.

Shortly after C called and advised me to compromise as it would be better all around, so I sent a bill to A and B for $300, which brought no reply. I waited a week or two and one day when in Boston called at A's office; he said that he had left the matter for D to settle, and for me to see him. I told him that I did not recognize D in the matter at all as my agreement was with him and his brother. He then said that $300 was too much, and that he could have had several architects do the work for $100. I still insisted on $300; he told me to think it over a few days and see if I could not take something off of my bill.

Some few days after this I was surprised by the objectionable contractor above mentioned coming in and asking for a foundation-plan of the proposed building as he wanted to give it to the engineer to set the batters. I gave him one and shortly after saw the engineer at work; I went out and gave him some heights, etc.

The following day the excavation was begun, but no word was given to me by A, B or D that they were going to proceed with the building. A few days after I wrote to A and B, withdrawing the bill rendered as it had not been accepted by them, and was rendered with the understanding that they were not to erect the building. I also stated that it was my intention to carry out my agreement with them to look after the construction of said building and collect 4 per cent on the cost of the same. I received a reply from A, denying any agreement that I was to do more than make the plans, etc.; in the meantime, they went on with the work and put in the foundation.

After having made considerable progress with the foundation, they applied to the city for a permit to build, which should have been done in the beginning. In the haste in making the plans slight errors had occurred which could have been rectified in fifteen minutes, which prevented them from getting a permit. On account of the disagreement in regard to the price they did not come to me in regard to this, but went at once to another architect, who has prepared new and somewhat different plans. My plans are yet in their possession.

I have been utterly ignored in the matter. I think it all comes from the malice of D, who wanted to get even with me for objecting to his man, the mason before mentioned. The whole thing has been very unpleasant, and through no fault of mine, as I always endeavor to do my work well and with honor.

Therefore, my dear sirs, if you will tell me how to proceed in order to get my rights, I shall be greatly indebted to you.

Yours very truly, "Veritas."

[On this statement, we should say that the best course would be to commence suit at once. It would be a strange jury which, under such circumstances, would not immediately award "Veritas" the full amount of his bill, with interest and costs. — Eds. American Architect.]

EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

New York, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES & CLIPPINGS

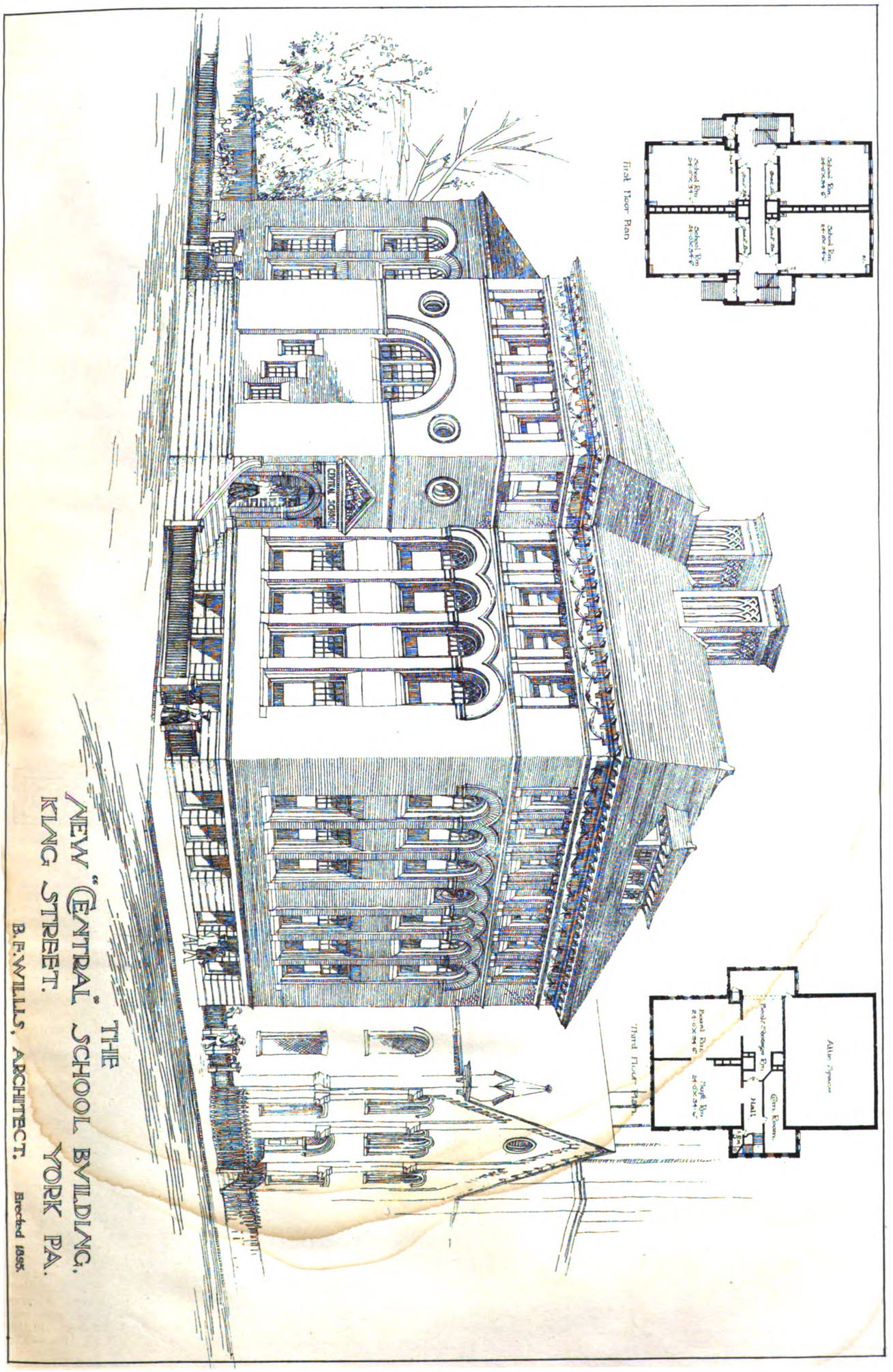
An Underground City in Turkestan. — Jules Verne thought he was writing of an altogether new and unique thing when he told his famous story of "The Underground City," but again truth proves to be stranger than fiction, as the Russians have discovered a big underground city in Turkestan, near the Bokhara town of Karki. Explorations of some big caves revealed the fact that they led to a city in the dark built thousands of years ago. According to effigies, inscriptions and designs upon the gold and silver money unearthed from among the ruins, the existence of the town dates back some two centuries before the birth of Christ. The underground Bokharan city is about two versts long, and is composed of an enormous labyrinth of corridors, streets and squares, surrounded by houses and other buildings two and three stories high. The edifices contain all kinds of domestic utensils, pots, urns, vases, etc. In some of the streets falls of earth and rock have obstructed the passage, but generally the visitor can walk about freely without so much as lowering his head. The high degree of civilization attained by the inhabitants of the city is shown by the fact that they built in several stories, by the symmetry of the streets and squares, and by the beauty of the baked clay and metal utensils, and of the ornaments and coins which have been found. It is supposed that long centuries ago this city, so carefully concealed in the bowels of the earth, provided an entire population with a refuge from the incursions of the nomadic savages and robbers. To this traveller's tale the *Buffalo Enquirer* might have added a description of the electric-lighting plant that may have been used by these ancients.

St. Giles, Cripplegate. — There is no church in London so grimly affecting, or more gruesomely picturesque than St. Giles, Cripplegate. Its lantern is strangely gaunt and blackened, its towers stark and solemn. The approaches are all straggling and curious; we fancy ourselves in a bit of some old foreign city. The curious skulls and hour-glass over the entrance to the churchyard are vigorously done. It escaped the great fire, and is an interesting church altogether — and picturesque. Here we find Milton's tomb, Foxe's, (of the "*Book of Martyrs,*") and that of a daughter of Shakespeare's "Lucy." And, as if this were not sufficient to reward one's curiosity, they will show us the registry of the marriage of Oliver Cromwell to Elizabeth Boucher. In the churchyard a large fragment of the old city wall is to be seen. — *The Gentleman's Magazine.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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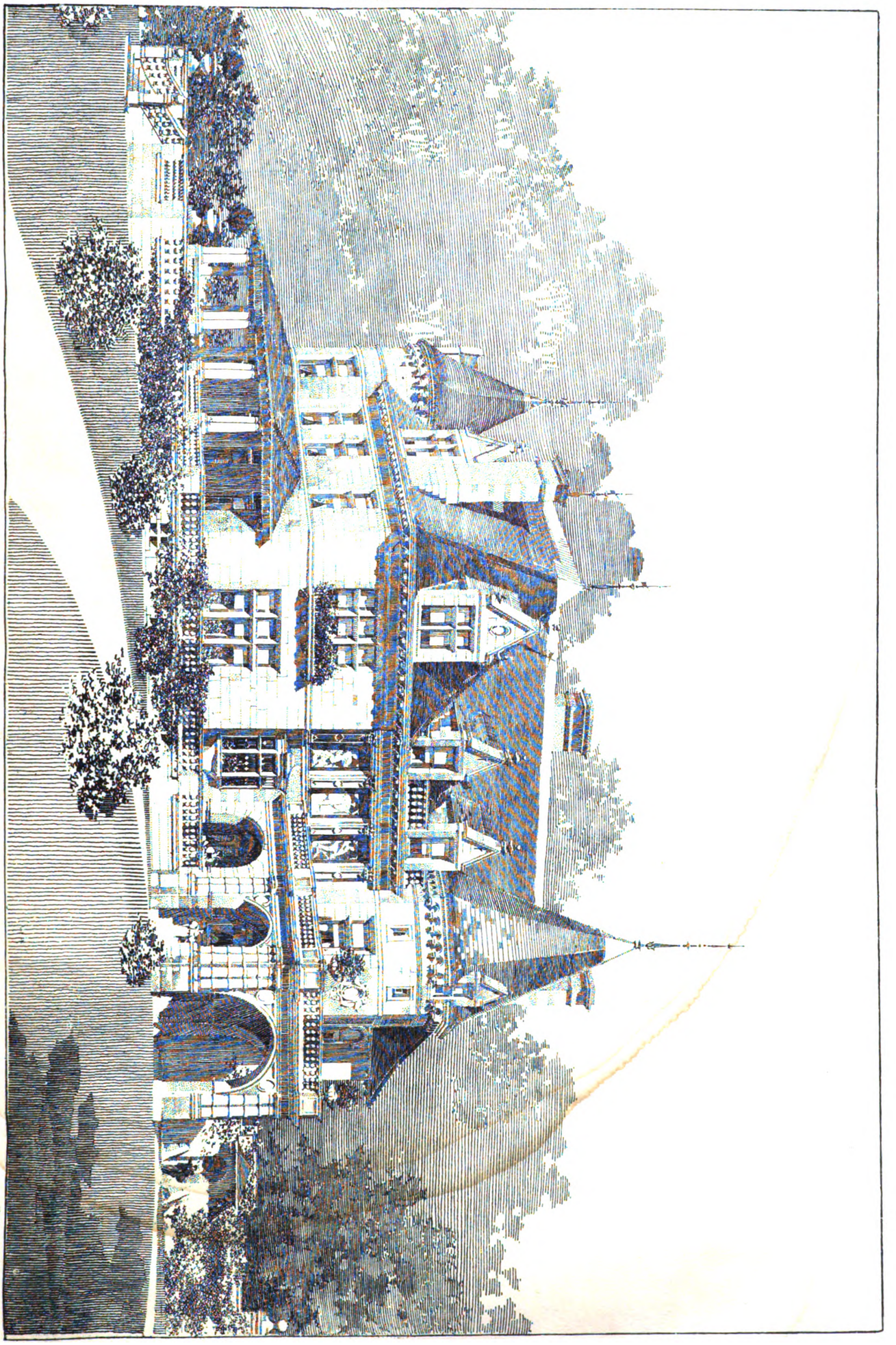
THE "CENTRAL" SCHOOL BUILDING, YORK PA.

B. F. WILLS, ARCHITECT. Erected 1895.

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HOUSE OF CYRUS H. K. CURTIS, ESQ., WYNCOTE, PA.

BAILY & TRUSCOTT, Architects.

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The Garfield School House.

Erected, 1895. York, Pa.

E. F. Willis, Architect, York, Pa.

Basement Plan

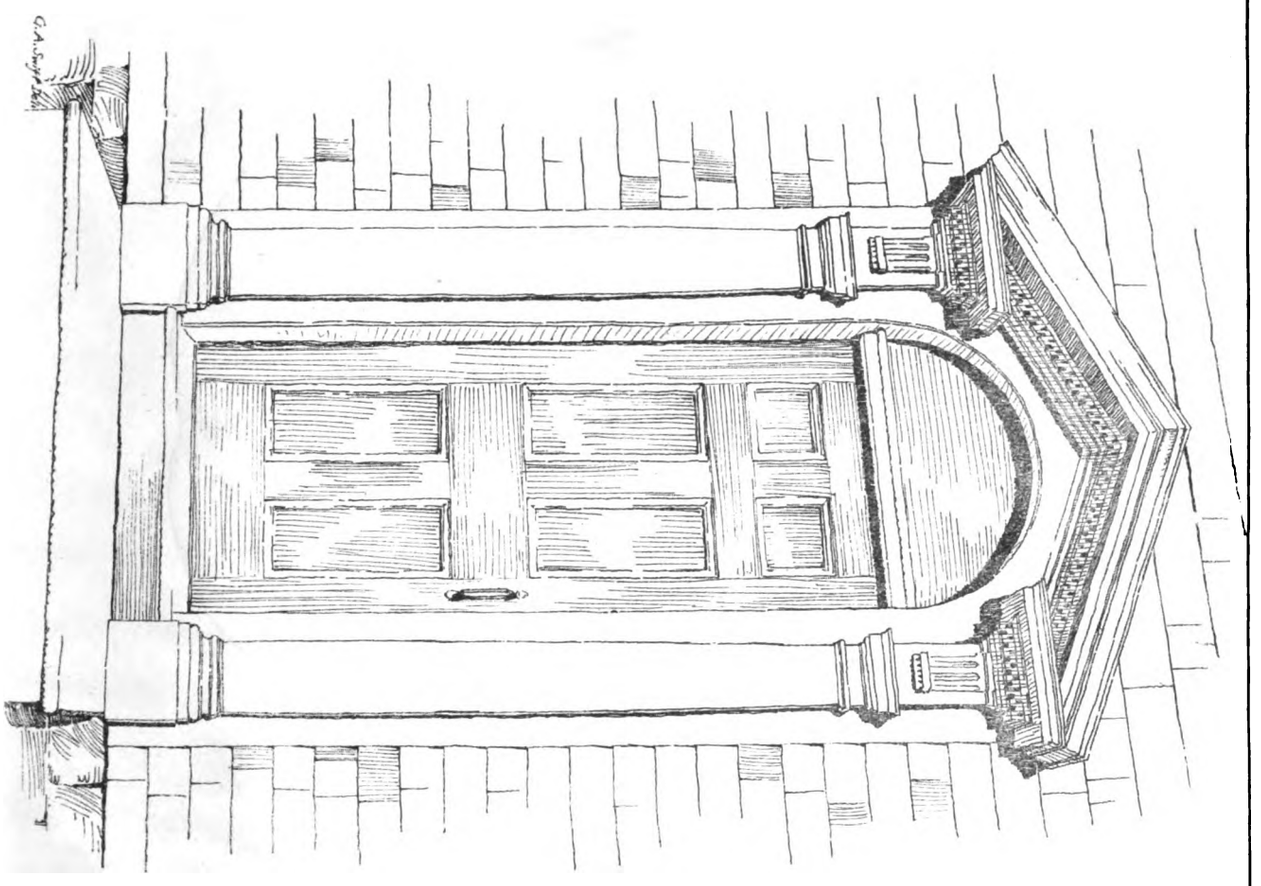
First Floor Plan

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DOORWAY, FAIRHAVEN, MASS.

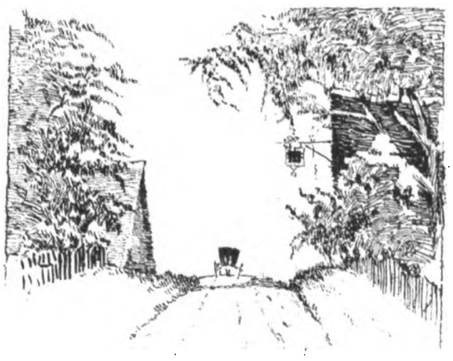


DOORWAY, ACUSHNET, MASS.

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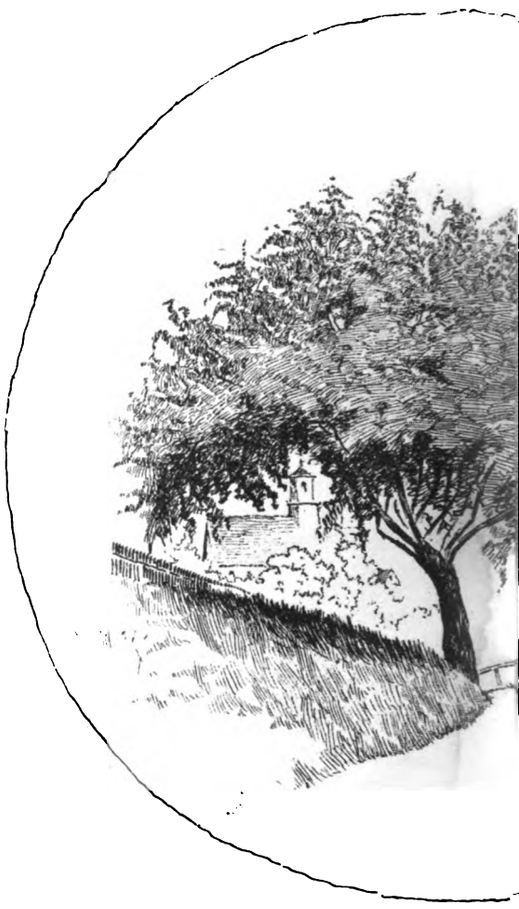
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A Bend in the Road



Lanpon's Cottage





On Annisquam Alley



The Cove



On Squam River

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A Sketch in the Evening





A bit of Curve St

James Jos. Maginnis





Arlington Street

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XLIX

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SEPTEMBER 28, 1895.

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THE *British Architect* says that the acoustics of the banqueting-hall in the Glasgow Municipal Building are defective, so that, as it is reported, "the most practised speaker cannot make himself heard over more than one-half its area." At the request of the city authorities, the city engineer held a consultation with a member of the Glasgow Institute of Architects, to determine what should be done to remedy the trouble. The architect thought that it would be necessary to make important structural alterations in the room. The authorities said that they could not entertain this idea, and the city engineer tried his hand at a suggestion. He discovered that the ceiling was covered with slabs of fibrous plaster, suspended from timber framing, and that there was a hollow space under the platform. This construction, in his opinion, gave the ceiling the character of a drum, and he advised lining the back of the plaster slabs with silicate cotton. For a similar reason, he advised filling up the space under the platform. These suggestions have been carried out, and we are told that the acoustic quality of the room has been perceptibly improved. It seems strange that a room with a resonant ceiling should be acoustically bad, a vibrating ceiling hung in this way usually improving the acoustics, by its property of conducting sound, without reflecting it; but there were probably serious defects of proportion in the room, which might be sufficient to produce echo and noise which the resonant ceiling could not overcome.

WHETHER lining the ceiling with slag-cotton would improve the matter appears to us extremely doubtful. The resonance of the ceiling would unquestionably be advantageous. Its tendency to produce an echo, which is a totally different thing, would be, so far as it existed, injurious. To line the ceiling with a mass of fibres would check such resonance as it might possess, and would not, so far as we can see, diminish in the least any disposition that it might have to produce an echo. In the same way, the hollow space under the platform would be, and was probably intended to be, acoustically valuable, through the reinforcement which the vibrating mass of air in it, or the elastic walls enclosing it, would give to the speaker's voice; and to fill it up with dead material seems to us a very strange proceeding. What city engineers may think on such subjects we cannot say; but architects should keep in mind the golden rule, that resonance, such as is to be obtained by thin, elastic linings, or even by masses of air judiciously distributed, is a thing to be sought in designing rooms for hearing music, or for public speaking; while echo, such as is produced by hard, unyielding surfaces, is to be avoided as much as possible. Every architect who has ever designed a music-room for a private house knows how greatly the effect of music is improved by lining the walls of the room, and if possible, the ceiling, with thin wooden panelling; and every layman who has ever bought a piano must have noticed what depth and richness is given to the tones of one played in the dealer's wareroom, by the sympathetic vibrations with which the strings of the surrounding instruments respond to the playing. For twenty centuries, at least, architects have sought in various ways to secure similar resonance in large rooms, understanding thoroughly the advantages to be derived from it. The Gewandhaus at Leipsic, reputed to be acoustically the most perfect music-hall in the world, owed its quality to the fact that it was surrounded by thin partitions, set at a little distance from the main walls of the building, which, by their own elasticity, joined to that of the mass of air between them and the walls outside, provided the resonance which experience has shown to be indispensable. In the same way, the La Scala Theatre, at Milan, one of the largest, and acoustically the most perfect, of all European theatres, was lined throughout with thin woodwork. The ancient Greeks, to secure resonance without the use of woodwork, placed under the seats of their theatres earthern pots, with the mouth turned toward the stage, the vibrating mass of air in these serving to reinforce the sound. On the other hand, rooms in fireproof buildings, surrounded on all sides by hard, rigid masses of masonry, are very apt to be acoustically bad. Even where the large rooms, by careful study of their proportions, are successful, the smaller rooms, which cannot be so proportioned, are, in such buildings almost always intolerably noisy. So far as the Glasgow banqueting-hall is concerned, it is, of course, impossible to say what may be the cause of the trouble; but we venture to predict that checking whatever resonance the ceiling, and the space under the platform, may possess, will do little to ameliorate it.

AT the Nineteenth Triennial Exhibition of the Massachusetts Charitable Mechanic Association, which opens October 2, there will be an exhibition of architectural drawings, which is intended to include, so far as possible, examples which have not previously been publicly shown in Boston. The Art Gallery, in which the architectural drawings will be shown, is usually a very popular part of the "Mechanics' Fair," and it is to be hoped that a creditable collection of works may be contributed.

IRON-WORKERS will be interested in an investigation made recently by M. Charles Frémont into the action of the punch in punching holes in metal. M. Frémont made to the Academy of Sciences a report upon the result of his experiments, from which *La Revue Industrielle* gives extracts. As every architect and engineer knows, structural iron is usually pierced by driving through it a steel punch, which enters, on the other side of the piece to be punched, a hole about one-tenth of an inch greater in diameter than the punch. This play between the punch and the matrix makes it easier to force out the round piece of metal removed by the punch, which, of course, must precede the punch, to fall, at last, through the hole in the matrix; but it has the disadvantage of making the holes punched conical, as the piece forced out is, at one end, the size of the hole in the matrix, while the other end, next the punch, is just the size of the punch. For this reason, it is often supposed that the play should be as small as possible, or that, if practicable, the punch should exactly fit the hole in the matrix.

M. FRÉMONT finds that the view is erroneous. In using a punch which exactly fitted the hole in the matrix, he found, by sawing the plate operated on before the process of punching was completed, that the piece of metal removed by the punch was, in this case, not a cylinder, but a double truncated cone, having its greatest diameter in the middle, and its diameter at each end equal to the diameter,

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respectively, of the punch and the hole in the matrix. In driving a piece of this shape through the plate, its conical form caused it to wedge itself in the plate, in such a way that not only was great power necessary to push it entirely through, but the plate itself was fissured around the hole by the lateral pressure. This effect, as M. Frémont found, explained the cracking around the punched holes in structural steel, which was once so common, and so dreaded that specifications for steel-work usually required the holes to be punched smaller than their finished size, and to be enlarged with a drill or reamer. Having thus assured himself that the attempt to punch cylindrical holes involved waste of power and risk of bending or cracking the plate, he experimented with matrix holes of various diameters, to see how much play was most advantageous. These experiments showed him that, so far as expenditure of power was concerned, there was no material difference, whether the matrix-hole was five, or ten or twenty per cent greater in diameter than the punch. He found, however, that, taking all things into consideration, the best punching was done with a play, between the punch and matrix, equal to one-fifth the thickness of the metal to be punched. As this would give a conical hole, requiring subsequent reaming, he devised a punch somewhat longer than usual, and furnished with several square-edged rings, or shoulders, just behind the punching end, which was a little smaller than the main body of the punch. After the small end of the punch had forced out its conical piece of metal, the circular cutting edges behind it, the largest of which was of the same size as the hole in the matrix, also penetrated the hole, cutting it from a conical to a cylindrical shape, without wedging or lateral pressure on the metal. As this effect was produced by the same blow that punched the original hole, the expense of subsequent reaming was saved.

MR. EDMUND GOSSE, in the *Magazine of Art*, makes a stirring appeal for the "Sculpture of Every-Day Life." Feeling that English sculpture, at the present day, is neither understood nor cared for by the public, he proposes that it should devote itself more to the subjects of the present time. As the Greek statues commemorated, very frequently, the victories of athletes in the games, so, Mr. Gosse thinks, our industrial triumphs might be celebrated by figures, say of "a welder with the tubes of a gun-barrel in his hands"; or "a screw-turner at his work in front of his machine" or "a caster in the brass foundry, ready to pour the metal into a mould." While we should have doubts whether any artist could make a screw-cutting lathe into a sculpturesque object, or whether a welder with a new gun-barrel furnished so valuable an inspiration as, let us say, the welder's wife with a new baby, the idea is certainly a good one. Believing, as we do, that the movements of the soul are more worthy of perpetuation in marble and color than those of the hands, there are still plenty of motives in modern life that both artist and people can appreciate. To apply Mr. Gosse's theory to our own country, with what a noble and affecting group might a great sculptor commemorate, for example, the Sea Island floods of 1893, or the surrender at Appomattox, or adorn a memorial bridge across the Potomac. If we would only think so, we need not envy the Greeks their artistic life, so far as sculpture is concerned. With all their delicate perception, and perfect execution, their sculpture has little of the sentiment which forms the soul of modern art. That they were not incapable of such sentiment is sufficiently evident from their poetry, but, with the exception of the Niobe group, there is hardly any Greek sculpture that represents emotion with even tolerable success. With us, the sentimental side of art is the best known and most favored one; and the work by which we shall in future win the highest place in the artistic world will be, above all, an art of expression and feeling. To develop sculpture in this direction, proper themes must be proposed for treatment, and the sculptors themselves would do well to try to guide the public taste in such matters.

THE recent Trades-Unions Congress, held at Cardiff in Wales, was remarkable in several respects. The most sensational episode was a fierce attack by John Burns, a noted "labor-leader," and member of Parliament, on Keir Hardie, another noted labor-leader, who was also a member of the last Parliament, but failed of election to the present one. Neither John Burns nor Keir Hardie are celebrated for their good manners or civil tongues, and the details of the squabble have not added to their reputation in these respects. Possibly, as a consequence of this exhibition, but more probably in pursuance of a well-considered previous determination, two changes in the rules were proposed by the Parliamentary Committee, or, as we should call it, the Committee on Rules, and in spite of the bitter opposition of the demagogues who have put themselves forward as the leaders of organized labor, were adopted. One of these rules provided that no one should be admitted as a delegate who was not actually engaged in the practice of the trade which he professed to represent. This rule would eliminate at once from the Congress the professional agitators, socialists and anarchists, who prey alternately upon workingmen and employers, and it was evidently intended to do so; and the majority of delegates present, by voting for it, declared their sympathy with it. The second rule provided that votes in the Congress should be taken, not by delegates, but by the actual number of bona-fide members of the unions represented in the Congress. This, again, was intended to prevent the Congress from being packed, in the interest of demagogues, by a disproportionate number of delegates from small unions, controlled, for that express purpose, by the agitators; and, like the other, it was fiercely resisted, but adopted in spite of the opposition marshalled against it. The prospect appears to be that these rules, once adopted, will be maintained, and that, at last, the interests of the English trades-unions will be looked after by people who know something of what their trades need, and can reasonably expect, and who can command the confidence and attention of employers as well as employed, and not by shrieking demagogues, whose sole object is to inspire terror in every one whom they can persuade or compel to listen to them.

M. RÉMAURY writes in *Le Génie Civil* a little note on the tragedy which took place last month at the Mines of Aniche. Our daily papers gave at the time a tolerably accurate account of the affair, omitting, however, many interesting details. It seems that, on the fourth of August, a celebration was held of the fiftieth anniversary of the entrance of M. Vuillemin, the present Director of the mines, upon his work. The celebration included exercises in the village church, and a banquet, to which all persons employed in the mines were invited, to the number of four thousand. As M. Vuillemin, surrounded by the engineers and foremen of the mines, with a considerable number of the miners themselves, was proceeding from the church to the banqueting-hall, a certain Clément Decoux, a young man of twenty-six years, who had been employed in the mine, but had been discharged, two years before, for misconduct during a strike, and who was well-known for his revolutionary ideas, ran toward the venerable Director, and fired at him five shots from a revolver. Four of the bullets took effect in M. Vuillemin's back and neck, and he fell. The bystanders seized Decoux, whereupon he pulled from his belt a small bomb, but before he could throw it, in some way it slipped from his hands, and, falling at his feet, exploded. The explosion hurled the murderer six feet into the air, tearing his clothes into rags. Four other persons, including the Administrator of the mine, were wounded, and in the excitement, Decoux's father, wild with indignation, kicked the corpse of his son, crying "Canaille! Assassin!" until he was dragged away by the people near. Except for having been discharged, as a consequence of his own misconduct, Decoux seems to have had no cause of complaint against M. Vuillemin, who had been a constant friend to his workmen for fifty years. On the occasion of his golden wedding, which occurred at about the same time, only twenty-three workmen, out of a total of three thousand nine hundred and ninety-eight, refused to subscribe for a present to him; and no hostile demonstration had ever been made against him before; so that the attempted assassination seems to have been simply a piece of insane malice; yet the socialist societies of the surrounding region have since united in placing a wreath upon Decoux's grave, as if he had been a martyr.

THE annual contest in the Architectural Department of the School of Fine Arts in Paris, for the Prize of Rome has resulted in the award of the Grand Prize to M. Patouillard. The first-second grand prize was awarded to M. E. Duquesne; and the second-second grand prize to M. T. Garnier. The subject of the competition was a palace for exhibitions. There were ten competitors.

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GERMAN CASTLES.[1] — V.

THE INNER, OR CASTLE COURT.

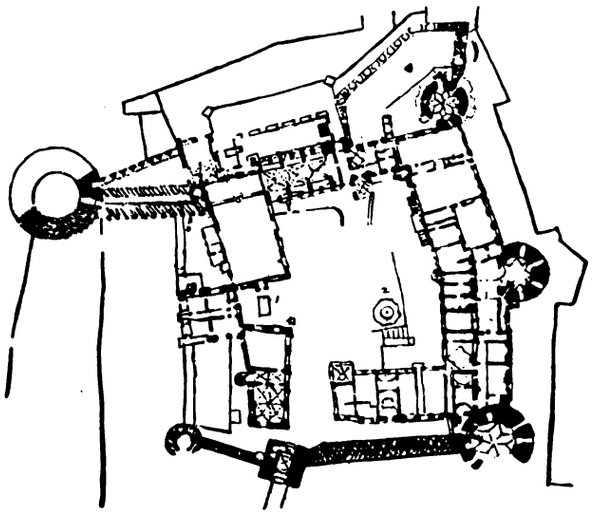


Fig. 33. Heidelberg Castle Court. 1. Old Well. 2. Well Colonnade.

THE inner, or castle court, called also the domestic (*wirthschafts*) court, is the open space in the heart of a castle (Fig. 33, Plan of Heidelberg Castle) around which the castle's palace, granary and stables are arranged.

It must not be confounded with the court-yards of the palace proper, to which we shall come later, for this latter building itself is but a member of a castle, one member out of several, so that the importance of its court-yard is necessarily quite subordinate, whereas the castle's court, on the contrary, is a prominent and essential feature. It is almost never absent, even where other features are lacking. If not present in one form then it is pretty sure to be in another form. Indeed, if we recall the plan of old castles to mind, we become aware at once of the urgent necessity for such a court. Compactly built castles, whose walls surround the peak of a hill, or rise from a water moat, afford no egress for either man or beast save through this court-yard. To step out at the front or outside of the palace, barn, or tower of such castles, would be to plunge down steep descents, or headlong into a watery bath; while this court, securely situated at their common back, affords a space for moving, breathing and working in.

In roomy, mediæval castles, such as the Wartburg [2] (thirteenth century), my lady's garden was laid out at one end of the court, the middle portion of the yard being reserved for the practice of games at arms, and the stable side of the yard for manure-bins; this famous castle's court being in all these particulars a good type of the ordinary German *hof*, for the prevailing court-yard everywhere in German castles is like that of the Wartburg. Right and left from the court entrance are the castle's barns and granaries, as well as the inspector's house (in place of the mediæval castle guard-house). Facing the entrance, with the entire space of the court-yard between, rises the *palast* or mansion. The two sides of the yard are enclosed by buildings that serve as stables for horses and cattle, and as lodgings for the castle menials. In the space thus surrounded, a small portion of ground is planted with rose trees, and composes "my lady's garden," a spot made famous by the songs of poets. The central major portion is devoted to riding, — modern courts also afford now and then riding-schools. Near the stables are open bins, constructed of wood or brick, for storing stable-refuse. Where the necessary space has been available, and the means of noblemen have allowed of the expense, court-yards have been widened in some instances so as to put the stables and barns at a distance from the noses of the inhabitants of the palace. But the examples are few,

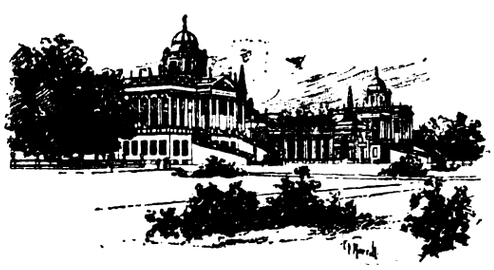


Fig. 34. New Palace in the Park of Sans Souci, Potsdam. — Commons, with Colonnade.

according to my experience, where these buildings are set out of sight as well as out of smell. In most cases the size of the courts is still comparatively modest; not so different from the prevailing mediæval, primitive *hof* as to prevent the student from reconstructing the latter in his mind's eye, with its mixed community of domestic cattle, big and small, its menials in leather shirts and trousers, its guardsmen in (plundered) knee-breeches of silk, and these guardsmen's lord and his lady with her "spinsters" in home-spun and home-embroidered wool and silk. Many a castle's *gesinde häüser* huddle together, shoulder against shoulder, or creep, as it were, to the feet of the mansion — pictures still, as they were centuries ago, of the moral subordination entailed by feudalism upon the laboring majority.



Fig. 35. Burg Eltz.

Other courts of castles represent admirably, though unconsciously, the haughty and unscrupulous pride of a later time. These are the castles of the eighteenth century; a century when French fashions were in vogue, and when social observances were the rage. Guard-houses, kitchens and stables in such castle-courts wear pompous architectural wigs, imitating classic openness, height and breadth (see the Communes of the Potsdam Schloss, Figure 34), and display colonnades and other *et-cæteras* of grand state. My lady's garden spreads as do *madame's* skirts, becoming in these eighteenth-century courts *parterres*, so-called; so that where her grandmother once smelled roses and refreshed her face in dew, madam trod on carpet-like beds of dwarfed plants, laid out with the same geometrical care as the ribs upon her crinoline. The cistern and its horse-trough became, in like manner, smart fountains of bronze, while the "exercise place" expanded into a parade ground.

Fortunately, this style was far too costly to remain the fashion long. The princes who had favored it and could afford it, but especially those who had favored it without being able to afford it, let the style expire with the last French king. The old rule was then gone back to, and German castle-builders filled up the vacant sites left by the conflagrations of the Seven Years' War and the wars of Bonaparte, with courts of the medium and familiar kind. Barns were recognizable as barns once more, and the rose-garden blossomed as in mediæval times before the *palast*, or in one corner of the court.

In the unequal function of the buildings that border castle-courts lies the explanation of the various aspects of their several façades, and of the uneven distribution of the few noteworthy structures among them. Almost all of these few fine structures, it must be observed, lie at one end, or on one side; namely at the palace end or upon the palace side. Thus in Albrechtsburg, near Meissen, we find the palace and the cathedral close together, and in Heidelberg in the angle where the most beautiful façades rise, arises also the most important tower. Here, too, are naturally the *grede*, or staircase towers, built fast on the palace (Fig. 35); while the massive walls of the latter building, if it belongs to the Renaissance by date or style, open into arcades (Fig. 35*b*, Court-yard of Dresden Palace), to serve as outside corridors. On the palace, finally, is the show door of the inner court.

The finest specimen of these portals, — the finest work, indeed, of



Fig. 35*b*. Schlosshof, Dresden.

the Renaissance in all Germany, once served as the chapel door of the Dresden castle, and was constructed against the north front of the court by Nosseni, in 1589. (See Figure 36.) This portal was loosened from the palace after the chapel inside was deserted for the new Catholic Church, and now stands in a protected spot

[1] Continued from p. 85, *American Architect* for May 7, 1892.
[2] See *American Architect* for December 5, 1891, page 146.

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at the east end of the stable-court, facing the Judenhof and Neumarkt. In many castles an incline, or ramp, leads up to the door, and this ramp often extends to a considerable height, occupying more than its due portion of the circumscribed space of the court-yard. In compensation for the room engrossed, however, the ramp is apt, wherever it is found, to lend an aspect of breadth of

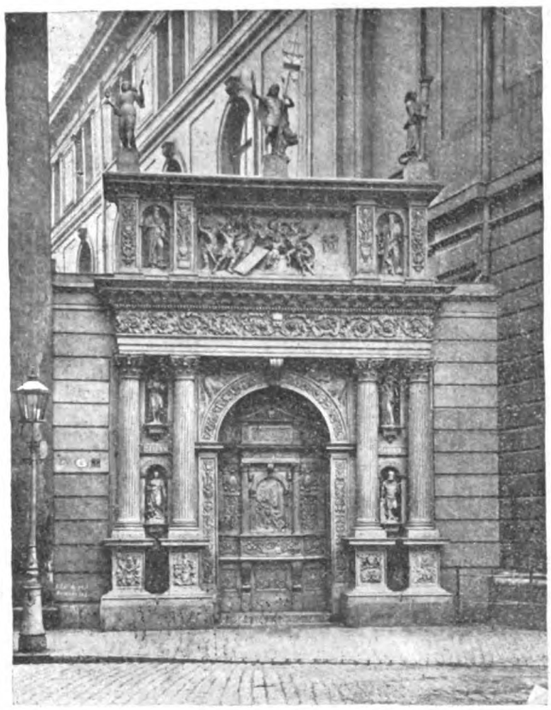


Fig. 36. Old Chapel Portal of Dresden Castle.

base to edifices, while its mason-work, a gatherer as it is of sand and earth, affords a foothold for the insinuating, decorative tribes of lichens, mosses and other plants. Here and there, indeed, these plants are sculptured in relief upon the face of the ramp, architects having taken a hint from nature and hewn the perishable vegetations into permanent stone. In Castle Hartenfels, at Torgau, the incline is transformed in the architectural plan into steps, and the ramp forms a base for the winding stairway of the palace. In Hartenfels, the openings of the beautiful stairway have been closed by glass windows. In most examples of Gothic and Renaissance stair-towers, the openings remain in their original condition and exhibit their striking, picturesque shadows and interior construction to every visitor in the court-yard. In the Dresden Castle the ramp forms the carriage-way to the exterior of the second story; in the castle in Stuttgardt, it is laid within the palace and formed the carriage-way to the Knights' Hall on the second floor.

The *grede*, or foot stairways of mediæval courts, in contrast with the equestrian stairway, or ramp, were built generally in the *corners* of the court-yard at the angle where the kitchen wing of the palace joined the main portion of the building in which the Knights' Hall was contained (see Figure 36*b*, Corner Tower of the Court of Dresden Castle) or where the guest's house joined the palace. Where castles are extensive, a stair-tower occupies each of the four corners of the court, besides being run up at almost any other point according to the needs of the castle's occupants. The fashion of constructing a gallery, supported by consoles, outside the palace, as in the castles of Berlin and Oels, and in Hartenfels, from one door in the first or second story to another door in the same façade, diminished the number of stair-towers by furnishing a means of communication from one end of the building to other rooms on the same floor. And during the fifteenth, sixteenth and seventeenth centuries these galleries were replaced by arcades, after the Italian style, so that the diminution in the number of *grede* became permanent. For the first time in Germany, a corridor was laid *within* a castle in 1559, the castle being that of Horst, in Westphalia. The earliest example of such a corridor being transposed into the middle of a palace, *with rooms opening upon it from both sides*, is that in the principal wing of the new castle of Baden, designed by Caspar Weinhardt, between 1570–1580. Yet even the court-yard of the Baden castle has two stair-towers, and modern imitations of old castles introduce such towers invariably, both as attached to the palace and as attached to the castle-tower or donjon. Thus, in the castle of Babelsberg, at Potsdam (Figure 37), there is a round stair-tower connected with the

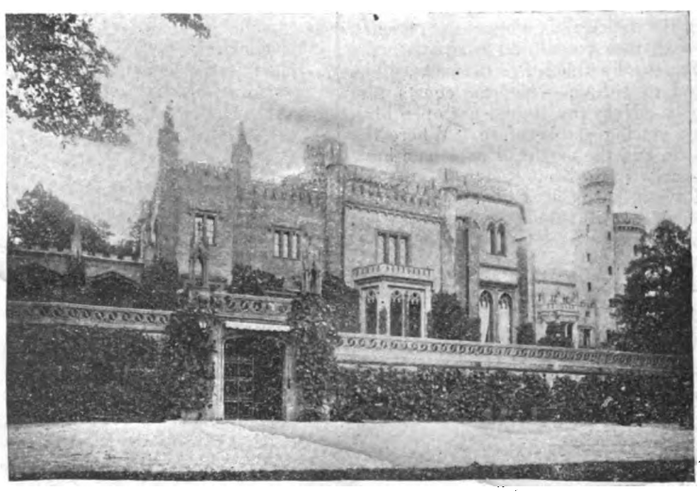


Fig. 37. Stairway to lower rooms of Schloss Babelsberg, Potsdam.

bergfried tower, in imitation of the stairway tower of Friedrich II, which is attached to the Tower of Ludwig V, at Heidelberg Castle (Figure 38). There remain only the court-yard, of castles of the eighteenth century and of the beginning of the present century, therefore, in which this feature — the stair-tower — is absent in the view of a castle court-yard.



Fig. 41. Inside Court, Castle Schwaneck.

In such comparatively new palaces, the grand portal, too, is often lacking, as in the Neue Palais, at Potsdam — the favorite and stately residence of the present Emperor of Germany — the reason being found in the fact that decoration was spread over the entire exterior of eighteenth-century castles, instead of being concentrated upon a few parts as occurred in earlier times. Eighteenth-century court-yards, however, display in common with other castle courts the two remaining features that are yet to be described; namely, the fountain or well-house, and the castle coat-of-arms.

The first-mentioned, the court well, was an absolute necessity of every burg, and in periods when thousands upon thousands of strongholds, petty and large, were being built, the mountains of Central Europe must have rung under the blows of the drill continually. It took nine years to hew the well of Castle Königstein, near Dresden, which is illuminated for the visitor by reflecting mirrors, and in which a stone is eighteen seconds falling from the brink to the water below, a distance of 214 metres, or 900 feet. Our writers, as it seems to me, have never yet sufficiently dwelt upon the subject of well-building in the Middle Ages, although tourists are often startled into reflecting upon the theme on coming upon remnants left of the Moorish reservoirs destroyed in Spain by the order of Queen Isabella, or on such examples of native work as in the fortress first named, where the well is like an inverted tower for width of circumference and beauty of masonry.

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At Castle Carlstein (Fig. 39), in Bohemia, I found the well in one end of the Zwinger or outer-bailey, on the outjutting spur of a low ridge of rock that leans against the main top of the hill, on which the castle is built like a bulwark. A small, but thick-walled tower covers it and the water is drawn up, as in ancient days, by means of a tread-mill. Elsewhere, too, I have found the



Fig. 39. Castle Carlstein.

well and its house or curb in a similar position outside the court-yard. But the general rule remains that its typical place is within it. And every reason is in favor of this choice of situation wherever the nature of the site permitted of it, for from the well the whole establishment was supplied: the castle kitchens with water for cooking, the castle stables with water for the cattle, the castle bath-house with water for the bath-fountain and basin-sink; and hence, the more central its position the more convenient. In case, moreover, of fire, it was most desirable to have it in a free space around which all hands could gather. The "new well" in Heidelberg Castle Court-yard (Fig. 40) at the right hand is covered with a colonnade, crowned by pointed arches, and adds still, as it must ever have done, a picturesque bit to that most lovely of German court-yards.

Lowland castles have frequently several wells within their environs, these structures in such ground not consuming the large sums which were needed for drilling down through rocky hills to the level of a river or lake. Yet even where several wells occur, one chief one, as a rule, is seen in the common, great, castle court, or on the spot which tradition has hallowed for it. Alas! that the old stone and wrought-iron curbs around them should begin so frequently to crumble, and that there is no fashion in vogue of repairing them carefully. The façade of buildings looking on the court, the portals in the façades, the tower stairways and ramps and *gredes*, all are restored; but no enthusiast has cried aloud over the court well and pronounced shame on its decay. So the lords of castles who ought to know better and perhaps do, and the squires who will not know better for any man not their like, let the stone domes and iron filagree arbors of their wells be removed and be replaced with patent pumps!

Let us turn away from the upstart, vulgar things to the last-to-be-mentioned characteristic detail of the typical castle-court. I mean the coat-of-arms that is ever visible in it somewhere.

Sometimes it is sculptured in stone and stands like a monument above the palace portal on the hood-moulding. Sometimes it is sculptured in stone and inserted in the mason-work of the wall in the same spot over the door, composing the chief ornament of the façade and its sole elaborated bit of decoration. Occasionally several shields,

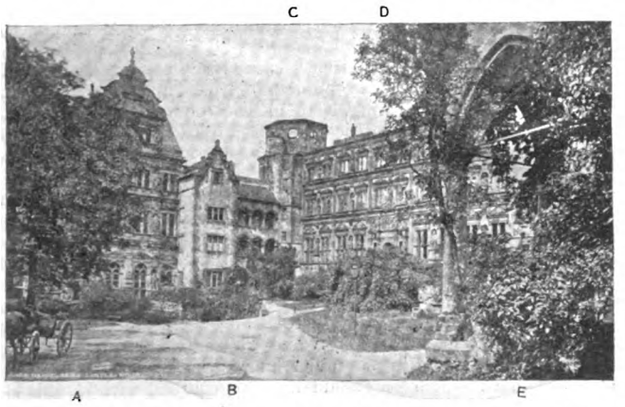


Fig. 40. Inner Bailey, Heidelberg Castle. A. Friedrich IV's bau, 1601. B. Library. C. Old Tower of Ludwig, elevated by octagonal top and changed to belfry by Friedrich II, 1544–56. D. Otto Heinrich's bau. E. Hallen bau and Well of Ludwig V, 1508–44.

cut in stone or cast in plaster, hang dispersed over the walls, though generally, I believe, such cases will be found to be rare — or cases where the possessor of the castle has a fancy for mediæval times and makes mediæval fashions a hobby, as was the case with the Sculptor Schwanthaler, the original builder and owner of Burg Schwaneck (Fig. 41), which is now in the possession of an American lady. The German nobleman of the present day lets his coat-of-arms be sculptured upon his plate and furniture and engraved upon his tobacco-cases and horses' hoofs; but he seldom falls upon the notion of letting it be sculptured monumentally. If he resides in the house of his sires, the arms are already on the castle's palace or tower wall; if in somebody else's ancestral burg, why, then, the strange shield of his predecessor occupies the place, and it is against his sense of what he calls piety to his *stand* or caste to remove it in order to make place for his own crest and arms. Half the castles and country seats I have visited in have borne the sculptured shields of earlier families. The show castle of Heilegenberg, finally, and numerous other burgs of the sixteenth century display their coat-of-arms upon the well-house of the castle-court. The stone or wrought-iron shield is placed on end upon the curb of the fountain against the side and under the hand of a sculptured figure of life-size.

Everywhere throughout Germany armorial arms which display a *hood* within a crown, betoken a prelate prince. The heraldic crowns of the electoral princes are recognizable by the ermine fur, which is represented as compassing the rim of the hood. The crowns of counts are known by the nine pearls or balls surmounting the band; those of barons, by their seven pearls, and those of the low nobility, by five pearls. A *parvenue* occupant of an ancient seat, who sets up a fanciful shield in his court-yard, in imitation of the old manner of castle proprietors, must see to it that his bogus crown has an even number of pearls or none at all. But, as I say, castles change hands, and the court-yard with all or any of its features seldom betrays its owner. It is always an historical and often a picturesque bit, but not familiary.

L. v. KROCKOW.

CHICAGO

COLLAPSE OF THE COLOSSEUM. — THE GREAT NORTHERN THEATRE. — EXPIRY OF PERMITS FOR OVER-HIGH BUILDINGS. — THE ARCHITECT OF THE POST-OFFICE NOT YET APPOINTED. — THE LAKE-FRONT MATTER. — THE SMOKE NUISANCE. — A GARBAGE CREMATORY. — MARINE ARCHITECTURE.

IF not a great many large buildings have gone up in Chicago this month, at least one has come down. Soon after the close of the World's Fair it was decided to erect a mammoth pleasure palace on the site of Buffalo Bill's Wild West Show. This building known as the Colosseum was begun several months ago and was to have been ready for occupancy by the Barnum & Bailey circus on the second of September. Of course every thing was rushed to its utmost, gangs of men working day and night on it. It was planned to have the structure Italian Renaissance in style, 770 feet in length by 300 feet wide. One great roof enclosed this immense space of nearly 240,000 square feet, which figure reduced to acres means nearly five and a half acres. The side walls of buff brick contained arched windows fifteen feet wide. In the centre of one of the side façades a square tower rose 240 feet. This tower, of the campanile variety, was nearly 50 feet square, and being furnished with elevators, was intended for an observatory. The topmost story was destined for a café and music-hall, while the roof was to have been utilized as a roof-garden. The seating capacity of the big building it was estimated would be 40,000. According to the plans the roof was to be supported by a series of great steel cantilever arches. The central arena was to have been nearly 700 feet long by over 200 wide, with a wide promenade surrounding the whole. Still beyond this promenade permanent seats and boxes were to be built. In the centre of the arena, three rings, two elevated platforms and water space were to be arranged. A gallery surrounded the whole area above the boxes.

August 24th, at a little after eleven P. M., just at the time when no work was being done on the building, the big structure collapsed, fortunately just at the time when the night force had left and the morning one, which came on at three A. M., had not arrived. All but one of the big cantilever trusses tottered over and fell, bringing, of course, everything else with them, so the structure now lies a mass of ruins.

Of course the cause of the collapse will be thoroughly investigated. The trusses rested not on the walls, but on separate piers, tied in pairs, resting on concrete and pile foundations. One theory advanced is that the fall was caused by a large quantity of lumber for the roof being piled on the trusses, most unevenly distributing the weight, and as the trusses were not tied together they could not stand such treatment. On the middle arch of the building was piled 50,000 feet of lumber and a quantity of roofing-felt. The weight of the lumber alone it is estimated could not have been less than 75 tons, and this weight caused the arch to sway and topple and in its turn to throw down the others. This theory, added to the fact that the trusses had been only half rivetted, would appear to be a satisfactory one for the cause of the falling. The steel has been examined by the best structural engineers and has been pronounced, as far as could be seen, without a flaw. Both architect and engineer bear names of

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the best repute in the country, and where the fault of the accident lies has not yet been ascertained, though of course the case will be sifted to the bottom.

The loss, which will mount up to over $100,000, will rest with the Construction Company, as the building had not been yet turned over to the Directors of the Colosseum Company. Had the collapse occurred a few hours earlier or a few hours later the loss of life would have been very great, and had the accident occurred a few weeks later when the great show-men had possession of the building and 40,000 people were under the roof, the result might have been appalling.

Another building destined for entertainment purposes here in the city and one which has had a hard time at its outset is the Great Northern Theatre. It was first intended to build a 16-story addition to the Great Northern Hotel, such addition to be used solely for hotel rooms, hotel offices, etc., with stores on the ground floor. A permit was taken out prior to the passing of the "sky-scraper" ordinance which limits buildings to the height of 130 feet. The permit was one limited as to time, but not till after the plans were changed and the mammoth hotel changed to an equally large theatre-building did the promoters realize that the permit they held was a useless thing. After a great deal of arguing and many conferences the permit was granted, not because there was any legal right in it, but from reasons of compassion (?) apparently. The Building Commissioner himself is reported as saying "I granted the Great Northern permit because the company had ordered its iron and made its contracts, and that there may be no trouble of a similar kind I have sent notices this morning to the holders of all permits for buildings whose heights are over the 130-foot limit of the city ordinance and have notified them that the old permits have expired by limitation." Six such notices were sent to people holding the old permits. The fact that the original permits called for a hotel and stores caused a good deal of trouble and discussion on the score of the theatre, and that portion of the structure could not be arranged under the old permit. This was accordingly stricken out, and as the theatre was only 85 feet high a new permit was taken out for the special portion to be erected between the two new wings of the hotel. This struggle goes to show that, unless the ordinance is repealed, this is the last extremely high building to be erected in Chicago and finally establishes the fact that the old permits are no longer valid.

The usual rumors concerning the appointment of architect for the Government building are still, as they have been for several preceding months, in circulation. Several men, according to first one report and then another, are in turn holding the first chance, or have, in fact, been already appointed, and the names which at the beginning of the contest were mentioned as a certainty seem to have faded into uncertainties. The report, also, that the Government is looking around for a man who will be contented to undertake the work for but small remuneration and a large amount of glory has been widely circulated, though discredited by nearly every one. But one architect has expressed himself as willing to take fame in the place of lucre, and his case was put so positively that its sincerity ought not to be doubted. He is reported as having said he was willing to go where glory waited him if he only got five dollars' profit. These principles have not been the ones on which he has previously done business, but it is hard to tell how a man will be affected when he gives himself up entirely to the "excelsior act." It was reported that $30,000 was the appropriation for draughtsmen and skilled service, but this sum, it is more than probable, was only the first appropriation, that would be increased by succeeding Congresses till the amount reaches the sum of the established rates of percentage.

For years there has been continual warfare between the City and the Illinois Central Railroad, concerning the ownership of the Lake-front. The question has been taken from one court to another till the highest tribunal has decided mainly in favor of the claims of the City, that is, the City's claims have been so far substantiated as to make it possible for its representatives to meet those of the railroad and decide on demands and compromises. Heretofore, it was with the railroad the control of the entire Lake-front or nothing, and, naturally, the City has made no effort to put in order even such lands bordering on the tracks as it did own. There is yet some possibility of some legal discussion over the filling-in of the Lake and some chance of injunction stopping the work, but high legal authorities have expressed themselves that the injunction would not stand, and should the talked-of plans be carried out, a very beautiful, or more properly, many beautiful features will be added to our city.

The conference between the mayor and his associates and the railroad authorities lasted three days and the results were very satisfactory to the City. The mayor's demands were as follows:

That the railroad build a sea-wall, 1,250 feet from the present shore-line, from Illinois Central Pier No. 3, the south boundary of which is Randolph Street, and to extend 6,400 feet south, which would bring it to Park Row, where the new station is located. This sea-wall would be required to be 25 feet wide on top, with a base at least 25 feet below city datum. It must rise six feet above the surface of the Lake. Furthermore, in the matter of sea-walls, one will be required running west, at right angles to this outside wall and meeting the present shore-line.

The Company are required to depress their tracks four feet below their present grade, which will make them eleven feet below the surface of Michigan Avenue and sixteen below the retaining-wall, which will be the surface of the park at the west line of the right-of-way.

The Company shall, furthermore, build this retaining-wall, west of the right-of-way, the top of which shall be five feet above Michigan Avenue.

Besides all this, fulfilment of the following terms is required:

The filling-in of the park to the top of this wall, sloping gradually to Michigan Avenue.

The building of four viaducts across the right-of-way: one at Madison Street, one at Van Buren and two at other points to be named later by the City.

The building of as many bridges across the right-of-way as the city might determine.

The extension of the Randolph-Street viaduct to the proposed park.

The filling-in of all the submerged land enclosed by the sea-walls.

And the building of a pier at the entrance to a proposed yacht-basin.

The City having completed preliminary arrangements, the Municipal Improvement League has taken up the question of the improvements, and plans for them have been drawn up by a committee consisting of three members of the Illinois Chapter of the American Institute of Architects and citizens interested in the subject. The idea of the Improvement League was that though the city authorities were fully able to deal with the legal and engineering portions of the question, there existed no public bureau capable of handling successfully the artistic side of the enterprise, and that it would be of immense advantage to the city, should some plan be brought forward by people whose business it was to know about such things and whose education had fitted them to see with a prophetic eye the best disposition of this possibly very beautiful part of the city. The plans provide for a bridge over the river near its mouth, that the Sheridan Drive of the north side may have a continuation through the southern park system. The idea of the committee was not to lay out a park similar in character to the many already possessed by Chicago, but to give the city something different—more like the Court of Honor of the World's Fair. It was, therefore, proposed to erect a façade running at right angles to the southern end of the Art Institute, while another similar façade should close the southern end of the park. These, with the buildings along Michigan Avenue, will form the three sides of the court, while the fourth remains open to the Lake. This area thus enclosed would amount to one hundred and forty acres. At the northern end of the park, the committee suggests that an exhibition building be placed, over 1,000 by 300 feet in size and an armory of the same size. These two buildings should be connected by a peristyle and triumphal arch and an amphitheatre seating ten thousand. The space thus enclosed should be used for a parade-ground.

Between Randolph Street and the Art Institute, it is also proposed, a new city-hall might have an abiding place, and the Police and Fire Department and Board of Education could also have quarters.

At the south end of the park, in a position corresponding to that of the Art Institute, the Crerar Library might be situated, while beyond the tracks corresponding to the northern group of armory, exhibition building, etc., a building for the Field Columbian Museum should be erected. This structure should be 200 by 1,000 feet square and should have an immense central dome. Instead of placing this building in the centre of the park it was thought wiser to put it at one side where it would not obstruct the view, and place in the centre a large lagoon with terraces rising from it. An island should be made in the centre of this lagoon, connecting with the main land by foot-bridges, and on the island could be a music-pavilion, open at all sides, and large enough to accommodate 300 vocal and 1,000 instrumental performers.

Charming as this plan is, it has caused endless discussion and elicited but little enthusiasm in municipal circles, and it is much to be feared that the whole thing is to be controlled by political pull. The papers and civic authorities talk of duplicating the glories of the Court of Honor, but to do these they seem to forget that genius and education must go hand in hand, that one master brain must have control of the general scheme, and that having once been given the control, no Alderman This or That, from ward so-and-so, or the other, should be allowed to dictate changes. Though the papers try to express the hope that the outlay for these improvements would be comparatively trifling, such a position is, of course, absurd, as the outlay would be tremendous. If, however, some such plan as offered by the committee were to be properly and successfully carried out in detail, it would give to Chicago a feature, the like of which could be found in no other American city.

One drawback which we should have to contend with in this locality and which did not affect the World's Fair, would be the smoky and dirty atmosphere. Since the Civic Federation has taken hold of the question of streets these are no longer a disgrace to the place, but the smoke seems to increase gradually and surely every year. A curious example of the effect of the soot and smoke is seen on the façade of the Art Institute. Our prevailing summer winds and those that are most smoke and soot laden as coming from the manufacturing districts are the southwest. Every bit of carving on the Institute Building has a dark shadow on the southern exposure while the opposite side remains light, and the stone, comparatively speaking, of its natural color. This gives a very curious effect, as if the

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carvings had been shaded like a charcoal drawing from the cast. The fight against smoke, one of our great and crying evils, continues, but that anything will ever be actually accomplished in keeping it within bounds, it is hard to believe. Recently, six complaints against tugs, eleven against railroad-engines and ten against private corporations were filed in one day, so perhaps matters would be a good deal worse if there were no smoke-inspector. However, the possession of the wildest imagination or a very untruthful disposition would be necessary, if one wished to assert that Chicago is a clean city, so far as its atmosphere is concerned. The place grows more dirty and smoky every year, slowly but surely; no section is exempt from the nuisance and it is an element that does more to mar what little beauty Chicago possesses than anything else. Life, the average Chicagoan feels, would be comparatively easy if it were not for dirt of various kinds.

At present the question of garbage is taking a prominent place in the minds of our city fathers and arrangements are being made to give a new crematory a trial. Chicago's growth has been so rapid that she has preserved many of her village characteristics in spite of herself. The question of garbage has been very inadequately handled, and much refuse that should have been burned has been dumped here and there, to be a menace to the neighborhood. The new crematory about to be placed on trial, it is claimed, will reduce to odorless ashes garbage, dead animals, night-soil, stale or condemned vegetables or meat without emitting any dangerous or obnoxious gases or stench from the furnace. It is a beautiful arrangement of nature that nothing goes to waste, and when the garbage of a great city is turned largely to use, as it is in Paris and some of the other European cities, our admiration is aroused; but almost anything is better than to have it lying around festering, and anything that will actually dispose of it in a neat and sanitary manner will be looked upon as a blessing by the community. The crematory to be tried will be over 60 feet long, 9 wide and 10 high, with a double stack 70 feet high.

Perhaps there is more activity in building circles in South Chicago, where the great ship-yards are, than there is in the actual city itself. From time to time we have noted the gradual growth of these yards and how marine architecture seemed to be taking its place among actual sciences here in this country. During this last month a big steamer has been launched from the yards on the Calumet River, destined to carry iron ore from Lake Superior. This boat, the "*Zenith City*," had its sister craft launched last June from the same yards. The two boats, on account of their great size, are noticeable among the ships built for the Lake trade. They are 400 feet long, 48 feet in width of beam, 28 feet deep in hold and can easily carry six thousand tons. The two vessels cost $250,000 each. At present they cannot be loaded to their utmost capacity, as the depth of the Sault Sainte Marie only allows of a draft of 14 feet instead of 20. The Government has on foot a project to construct deep-water channels throughout the Lake system, so this drawback will in time be remedied.

One thinks of a boat as a comparatively small thing, and it is, when compared to the ocean on which they float, but a local paper recently made a curious comparison, which brings sea and land dimensions into strict competition. We have none of us thought of the American Champion "*Defender*" as anything but a small craft, while we, here in Chicago, have thought of the Hartford Building, a fourteen-story office structure, as a pretty big thing. Placing the keel of the "*Defender*" on the sidewalk line, the top of her one mast would come just on a line with the cornice of that building, while the stretch from the point of her jib-boom to the end of the boom of her main-sail would be over double the width of the Hartford frontage. Perhaps a sailor's contempt for us "land-lubbers" is justifiable after all.

A SYLLABUS OF EARLY CHRISTIAN, ROMANESQUE AND GOTHIC ARCHITECTURE.[1] — IV.

EVOLUTION OF MEMBERMENT. — CONTINUED.

MONUMENTS.

THE following monuments serve as illustrations of the different groups and systems without intending always to show any special derivation of motif in one monument from another.

The evolutionary order does not exactly follow the grouping of monuments alluded to before, but rather the following:

A. THE CRUCIFORM PLAN.

1. *Basilical type with wooden ceiling.* [*Here one concentric structure ought to be inserted.*]
2. *The non-basilical structure.*
3. *The vaulted basilica.*

B. THE CONCENTRIC PLAN.

A. I. — THE BASILICA OF THE EARLY CHRISTIAN TYPE. — PERIOD NINTH TO TWELFTH CENTURY.

This type is best represented in Germany.

Historical position of the country as the predominant monarchy of the age. The German king at the same time Roman emperor. Within his own country the feudal system makes him dependent upon the great vassals and the continued existence of provincial differences and jealousies threatens to split the country up into parts.

Also in architecture the provinces to a large extent maintain their autonomy and distinguish themselves by some peculiar feature.

Common for Germany is *the basilical type and the Latin cross.* But the exceptions in case of the latter are frequent.

[The German method of distinguishing between the monuments by means of the supports, *e. g.:* (*a*) Columns; (*b*) Alternation; (*c*) Piers.]

Among the earliest buildings (Franco-Carolingian time) are the basilicas at:

Hersfeld, begun 798, rebuilt 831-850.
Fulda, eighth and ninth centuries.
Old Cathedral at Cologne, 814-873.
Michelstadt, finished 827.
Seligenstadt, begun 828.
St. Gall, begun 830,
and others.

1. *The oldest and crudest form. No memberment. Piers with arcades. Ground-plan undeveloped:*

Basilica at Michelstadt, ninth century.
Church of St. Emmeram at Ratisbon, 1002-1020. [Double apses. Western transept.]
Church of Our Lady at Halberstadt, 1005. [Subsidiary choirs.]
Nave of St. Mary in Capitol at Cologne, 1049.
Church at Druebeck, eleventh century. [Western apse.]
Church at Jerichow, 1135.

2. *Horizontal moulding in connection with columns or alternation:*

St. Michael at Hildesheim, 1001-1033. Rebuilt in twelfth century. [Double apses. Double transepts.]
Church at Limburg on the Hardt, nave, 1030-1042. [Square apse.]
Church at Hersfeld, rebuilt 1040.
Dome at Constanz, 1052-1068.
Church at Hirsau, 1060-1071. [Subsidiary choirs. The order of Cluny. Model of a whole group of edifices.]

3. *With vertical moulding from support till horizontal line:*

Church at Paulinzelle, 1105-1119.
[Type of Hirsau. Columns.]
St. Godehard at Hildesheim, 1130. [Double choirs. Alternation.]
Church at Sekkau, 1142. [No transept. Alternation.]

4. *Vertical memberment:*

Church at Moosburg, 1171. [No transept. Aisles terminating in apses.]

5. *Galleries.*

a. No memberment:

Church at Werden am Ruhr, ninth and eleventh centuries. [Vaulted aisles. Piers.]
Church at Heimersheim, twelfth century. [Piers.]

b. Horizontal memberment:

Convent Church at Gernrode, 961. [Alternation.]
St. John at Niederlahnstein, twelfth century. [Aisles cross-vaulted.]

c. Vertical members:

St. Ursula at Cologne, 1155. [Aisles vaulted. Piers.]
St. Kastor at Koblenz (walls). 836. [The vertical strips end in pointed arches (middle of twelfth century). Composite piers, 1190-1212.]

FRANCE.

Even to a greater extent than Germany, at this time France is made up of many parts connected with the crown only by feudal ties. During the eleventh and twelfth centuries French vassals became kings of England and united great possessions in France with their royal power. Other parts, such as Burgundy, Provence and others, are at this time independent States or temporarily under the supremacy of the German emperor. In the South the nearness of Spain and the commerce with the Orient and Byzantium may be said to possess a greater interest for these parts than the affairs of the kings of France.

The divisions of the country are naturally formed by the main rivers and their tributaries:

1. The valleys of the Garonne and the Lower Rhone constitute far the greater part of Southern France, *i. e.*, Aquitania, Languedoc, Provence, etc.

2. The valleys of the Loire, the Upper Rhone and the Saone constitute Central France, *i. e.*, Anjou, Maine, Poitou, Bourgogne, etc.

3. The territory around the Seine and the Somme constitutes Northern France, *i. e.*, Domaine Royale, Champagne, Picardie, Normandie, etc.

Southern France. — There are hardly any remains of the basilica with wooden ceiling although this form was probably common during the Carolingian period. The Saracens and Normans probably destroyed whatever structures they found.

The Christian Provinces of Spain are closely connected with Southern France throughout the period. The conquest of the greater part of the peninsula by the Mohammedans began 711. Caliphate of Cordova, 756-1031. All that remained to the Christians were some provinces in the North and Northwest.

In these parts the structures were rather small and simple. Very little is known about this older period of architecture.

Central France. — In the Western provinces the basilicas are superseded by small vaulted structures with one nave.

Northern France. — Normandy maintains a separate position among the provinces of Northern France. In architecture the tendency towards vaulting of the nave in larger structures is obvious in the system employed.

[1] Continued from No. 1029, page 111.

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The singular development of the choir (*apse with surrounding aisle and radial chapels*) that belongs to France has perhaps had the following course:

St. Martin at Tours, 470. [Reconstruction, 997-1014. Vaulted in twelfth century.]
Notre Dame de la Couture, at Le Mans, ninth century. Second period, 990-1007.
St. Remi at Rheims, ninth century. Second period, eleventh century,
and others.

Apse with subsidiary choirs. The origin of this form is *Cluny*, second period, 981; imitated in numerous churches in *France*. [*Tunnel-vaulted basilica, Group* 1, see below.]

Church at Anzy le Duc, eleventh century.
Church at Romainmotier, eleventh century.
Cathedral at Autun, twelfth century. [All vaulted, and others.]

In *Germany:*

Cloisters of the order of Hirsau.

In *Normandy:*

Church at Bernay, etc. [See below.]

In *France* most churches have vaulted aisles.

1. *The earliest type without vaulting of aisles:*

Basse Oeuvre at Beauvais, 990.
St. Generoux (Poitou), 1000.
St. Martin at Angers (Anjou,) beg. of eleventh century.

2. *With galleries:*

a. As decorative feature:

Basilica at Vignory.

b. Horizontal memberment:

Church Montier en Der, tenth and eleventh centuries.

c. Aisles vaulted:

Church at Solgnies. Lower part of nave, beg. 963. [Alternation.]
S. Remi at Rheims, consecrated 852, reconstructed, 1005-1049. [Signum Tau. Aisles on transept, transverse tunnels in aisles.]
Church at Bernay. Lower story, 1025. [Aisles tunnel-vaulted.]

Of the type of Bernay:

S. Georges at Boscherville, 1050.
S. Vigor at Cerisy la Foret, 1030.
Cathedral at Tournay, beg. 1146. [To this period belong nave and part of transept.]

d. Solitary transverse arches and vertical shafts:

Notre Dame du Pre at Le Mans, 1100. [Narrow gallery (triforium).]

e. Vertical memberment:

Church at Mont St. Michel, beg. 1022, vaulted in twelfth century. [Cross-vaulted aisles. Triforium.]
Church at Jumieges, 1040-67. [Triforium]
Abbey Church of St. Etienne at Caen, beg. bet. 1063 and 66-1077, vaulted during twelfth century.

ENGLAND.

Continuation of the system created in Normandy. Vaulted aisles.

1. *Prevailing horizontal memberment:*

Church at Kirkwall, beg. 1188.
Church at Carlisle, twelfth century.

2. *Vertical memberment:*

Cathedral at Winchester, transept, 1079-1093. [Transept double-aisled.]
Cathedral at Ely, beg. 1079, fin. 1174. [Western transept.]
Cathedral at Peterborough, choir finished 1140, nave, 1177-1193. [Transept double-aisled.]

ITALY.

Different parts being possessed by different nations — of which only the Germans attained superiority over several provinces at the same time — the provincial character of Italian architecture is very strongly marked. The Early Christian style, however, is still a generally cherished form all through the country, Central Italy and Rome being typical in their conservatism.

In *Rome* rebuilding of a few older basilicas, which, however, does not change their character:

S. Clemente, rebuilt 1099-1118.
Sta. Maria in Trastevere, 1139.
S. Lorenzo fuori le Mura, thirteenth century.

In the *rest of Italy* the Early Christian basilica the prevailing form. Either no transept or the latter not extending beyond the sides of the building.

1. *Without any memberment:*

S. Abondio at Como, eleventh century.
S. Pietro Toscanella, end of eleventh century.
S. S. Apostoli at Florence, twelfth century.

2. *With horizontal memberment:*

Dome at Viterbo, 1100.
S. Frediano at Lucca, 1112-1147.
S Michele at Lucca, twelfth century. [Signum Tau.]
Sta Maria Toscanella, twelfth century.

3. *With galleries and horizontal memberment:*

Dome at Pisa, 1063, enlarged about 1100.
Cathedral at Trani (Apulia), 1094. [Vaulted aisles. Peculiar form of choir.]

4. *Transverse arches:*

Sta. Prassede in Rome, ninth century.
S. Miniato in Florence, tenth century.
S. Celso in Milan, tenth century.
S. Zeno at Verona, twelfth century.

5. *Galleries and transverse arches:*

S. Niccolo at Bari (Apulia), 1035-1105.
Cathedral at Novara, eleventh century.
Cathedral at Modena, 1099. [Vaulted during twelfth century.]

Lower Italy is remarkable for a fusion of Byzantine and Latin influence brought about by the long possession of this region by the Byzantines and the sway of the Roman church, which nevertheless maintains itself. *Sicily* was possessed by the Byzantines and conquered in 827 by the Arabs till in 1090 the Normans made themselves the masters of the island after having beforehand acquired possession of Lower Italy.

(Lower Italy.) Cathedral at Salerno, 1077.
S. Niccolo at Bari, 1035-1105.
Cathedral at Trani, 1094.
(Sicily.) Cathedral at Monreale, 1174-89.
Capella Palatina at Palermo, twelfth century.

M. Wergeland.

[To be continued.]

THE TRADES-UNION CONGRESS.

The twenty-eighth Congress of what has been called the Labor Parliament met a week or so ago at Cardiff. Great interest attached to its proceedings by reason of the fact that grave questions of constitutional importance, as well as of policy, had to be discussed, in so far as these pertain to labor. The crisis had been brought about by the vaunted capture of the congress by the Socialists and the Independent Labor Party. The capture was an empty one from the beginning, but it involved some nice questions of procedure, and led to much recrimination as to policy. For the sake of clearness, matters of procedure and the constitution of the congress must be dealt with prior to those of policy. The Trades Congress was from the first intended to be a labor congress, and not in any party sense political. In fact, the term legislative is a better one to apply to it than political, for the object was legislative changes in the laws of the country pertaining to labor, although the machinery to be used for the purpose was of necessity political. That is to say, the changes sought could only be effected by political means. Delegates were selected by the various societies, not on political grounds, but by reason of the supposed knowledge by the candidates of the needs and requirements of their fellows and class from a labor point-of-view. Most of the delegates have always been Radicals in politics, but with a few notable exceptions. But the Radicals never sought to make the congress a mere electoral propagandist body; on the contrary, such action was deprecated. Occasionally it was led to take that complexion, but it was always rather in appearance than in fact. Within the last few years there has been a more distinctively political tinge than formerly, which tinge has created difficulties, now to be guarded against with greater care than ever. Previously the dangers were from without, latterly they have been within the body; consequently, more stringent means were required to deal with the disease.

These annual congresses were instituted in Easter week, 1868, by a number of trade-union officials. At the first three congresses there was no code of standing orders, the regulations being temporary for each congress as the needs arose. At the second congress, held in Birmingham, and again at the third, held in London, political bodies sought admission, and were refused as such. But certain men got elected by *bonâ-fide* trade societies, and, as delegates, brought forward their own pet schemes. The delegates generally were in accord with the views put forward in the papers read, or the resolutions proposed, and the congress, as a body, passed resolutions accordingly. But the danger was seen, and hence the first Parliamentary Committee framed a body of standing orders, which orders were indorsed by the Nottingham Congress in 1872. The principal object of those "orders" was the exclusion of all except *bonâ-fide* representatives of trade-unions. To some extent the object was attained, and several exclusions took place as a result. Then the scheme was tried of having extra sittings outside congress itself, at which papers were read and resolutions were passed by the delegates who attended such meetings. This could not be interfered with, but still there was a lurking danger. Another object of the standing orders was such a limitation of credentials as would restrict the representation to *bonâ-fide* trades, and so get rid of dual representation. This had reference to the representation of trades-councils, and of branches of societies. Perhaps the latter was aimed at more than the former, because some branches sent delegates to counteract the votes of the general body as represented by the officials or the official delegates. Trade-councils were always recognized as dual representation, but as the functions of such councils were of a wider character than the trades-unions, they were regarded with favor, and always held their own. Latterly these councils and labor unions have become more and more political and aggressive, and their votes have helped to turn the scale in favor of the socialistic propaganda. The new standing orders, therefore, strike at trades-councils as well as at political organizations, and especially at such bodies as the Independent Labor Party and the Social Democratic Federation. It is a blow struck at the capturing policy of the last few years, and it is in a stringent form.

The policy involved in the new standing orders, as regards representation and voting, is doubtless open to criticism. The

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measure is a strong one, but the nature of the disease required a strong remedy. The value and usefulness of the congress, nay, its very existence, was at stake. It had been used by factions for their own purposes, and there was naturally a revolt on the part of many of the older and the best-organized unions. The new unionists sought to exclude the older leaders; now new and old are excluded, except upon certain well-defined conditions. It must be *bonâ-fide* representation not only by accredited delegates, but each of the latter must represent his own trade, and none other. Dual representation by trades and labor councils is prohibited, but dual representation by branches is left untouched. The delegate, however, must in all cases represent his own particular trade. There is, therefore, great restriction as to choice, and less chance of the congress being used by faddists or political wire-pullers. But the innovation of voting papers by members represented, is a doubtful practice, especially when, as is alleged, one delegate out of several may cast all the votes on a given side, in the absence of his colleagues. This is a mild form of proxy voting which was most loudly condemned when exercised by the House of Lords. It seems strange that a body which is demanding the abolition of the House of Lords has gone back to one of the alleged evils of that House. It was thought that congress would refuse to ratify the new standing orders, but it did not; they were not only affirmed, but put in force from the very first. The resolution which was subsequently passed against any alternation by the Parliamentary Committee makes them even more binding and permanent, though presumably that was not the object of the movers of the resolution. It is thought by some that the trades-councils may break away and form another congress. This is not very likely. They could not find the means to pay the expenses. Their own expenses are paid by the different societies, and if they attempted to lead off another body in opposition, the contribution of the societies would be withdrawn. They might find some pecuniary support from wire-pullers, but then their influence would be gone. The fact is that the labor revolt of the newer section of the Labor Party is crushed, in so far as the manipulation of the Trades Congress is concerned.

But it was not only the machinery of representation and of procedure which occupied the attention of congress — there was also the labor policy of the new unionists. This had two prominent elements, first, the eight-hours' day, and, secondly, the socialist resolution — taking over the means of production, distribution and exchange. The first to be dealt with was the eight-hours' question, and here congress is still at the feet of the socialists. So absolutely is this the case that the miners asked to be exempted from the operation of that resolution. The resolution declares in favor of an eight-hours' day by Act of Parliament, and, as explained by its mover, no man is to be allowed to work more than eight hours in any 24 hours, and is not to be permitted to make up the loss of one or two days at the beginning of the week, at the latter end of the week. This is logical, if not very practical, but the mere fact of its passing in that form will be its own cure. The seeds of dissolution were sown at its birth, and as a practical aim it has missed the mark. When workmen get to understand that the real effect of such a resolution will be to lessen their earnings, they will toss it over as the wild dream of wild enthusiasts. Life is to be mechanical, no elasticity, labor-logged by Act of Parliament. One probable consequence is that it will beget a revolt against the eight-hour system, a system gaining ground all the world over as a sentiment sooner or later to be realized by mutual arrangement. It is strange that men who declaim against "labor slaves" should themselves seek to rivet the chains by an iron law. But so it is. They seem not to know anything of labor's history. That history shows that reductions in working hours is in the nature of a law of progress; it is slow, but when a reduction has once taken place, it is seldom, very seldom, that the longer hours are ever reverted to. Wages may fluctuate, but the normal working-day becomes an established fact. On an average, the working hours have been reduced by 18 per week within about 50 years, from 72 to 60, then to 54, in some trades 53, and, latterly, in many branches of trade to 50, or even 49 hours per week.

The discussion on the collectivist resolution, a subject about which there was more real public feeling than there was over the constitution and internal regulation of the congress, ended in a fiasco. Notice had been given to move that the before-mentioned resolution be rescinded, and accordingly a resolution to that effect was moved, but the terms of the motion did not fulfil the conditions of the standing orders, inasmuch as it did not set out the full terms of the resolution to be rescinded. The president accepted the point of order, and ruled the proposal to rescind the collective resolution out of order, and therefore it fell to the ground, the debate being cut short after the speech of the mover. This is a lame and impotent conclusion for the great Labor Parliament of the United Kingdom, for it leaves confusion worse confounded. The Norwich resolution remains on the minutes, but the congress refused to censure the Parliamentary Committee for ignoring it; so that, while the resolution remains, the congress indorses the action of its committee in refusing to take steps to carry it out. But another matter deserves notice in this connection, namely, the fact that the congress passed two substantive resolutions quite in accord with the collectivist resolution, though modified in extent and application — the nationalization of land, mines and minerals, and of railways, and also the municipalization of the docks, so that the socialistic features are still in the ascendant. These far-reaching resolutions, perhaps, indicate the paucity of pressing legislative grievances, and show that, in lieu of such grievances, the delegates to the congress can afford to legislate for futurity rather than for the present generation. The congress, however, took care to reduce the socialistic element on the committee to almost the vanishing point, for only two are left out of 12 members, so that there is little chance of any attempt to carry out the collectivist resolution during the current year, whatever may happen between now and the next congress.

The general proceedings of the congress were of a character to command respect, especially when it is remembered that the topics were exciting, and upon which there were strong divergences of opinion. There were fewer scenes than at recent congresses, and there was, on the whole, good-temper and moderation. There have been scenes in the House of Commons quite as tumultuous as the worst of those in last week's congress, and with less provocation. In the matter of procedure and conduct, there was consequently little to complain of. But the value of the congress will be judged by the practical programmes of past congresses, where measures of pressing utility were discussed and adopted, and were subsequently carried through Parliament. There was no lack of such measures before the delegates this time, and they were carried with general consent. But these are overshadowed by the wider scope of the socialistic resolutions indorsed by the congress, especially in view of the fact that the one demanding that all the means of production, distribution and exchange shall be handed over to the State, to the utter annihilation of individual enterprise in the economy of industrial pursuits was left on the minutes, unrescinded. The policy of such a programme is open to question, without going into the *pros* and *cons* of the right of the State to take over all and sundry of the industrial forces of the nation. Trade-unions, as such, are part and parcel of the existing industrial situation. The overthrow of existing conditions would destroy the unions, that is, on the lines proposed. In the struggle that would ensue, and will ensue, to effect that overthrow, the chances are that the unions would perish first. What, then, would become of labor? But the problem need not further be pursued. The existing conditions will outlast the nineteenth century, whatever may happen in the twentieth. During the few remaining years of the present century, it would be better to ameliorate and improve, and not to revolutionize. "Whatsoever thy hand findeth to do, do it with all thy might," is a text that the labor leaders would do well to ponder, and to apply as opportunity serves. — *Engineering.*

CIVILIZATION AS A CURSE.

THE following is the text of Prof. Flinders Petrie's remarks on the effects of modern civilization in his address before the British Association:

"The foremost principle which should be always in view is that the civilization of any race is not a system which can be changed at will. Every civilization is the growing product of a very complex set of conditions, depending on race and character, on climate, on trade, and every minutia of the circumstances. To attempt to alter such a system apart from its conditions is impossible. No change is legitimate or beneficial to the real character of a people except what flows from conviction and the natural growth of the mind. And if the imposition of a foreign system is injurious, how miserable is the forcing of a system such as ours, which is the most complex, unnatural and artificial that has been known; a system developed in a cold country, amid one of the hardest, least sympathetic, and most self-denying and calculating of all peoples of the world. The result is death; we make a dead-house and call it civilization. Scarcely a single race can bear the contact and the burden. And then we talk complacently about the mysterious decay of savages before white men.

"Let us turn now to our attempts on a higher race, the degenerated and Arabized descendants of a great people, the Egyptians. Here there is much ability to work on, and also a good standard of comfort and morality, conformable to our notions. Yet the planting of another civilization is scarcely to be borne by them. The Europeanized Egyptian is in most cases the mere blotting paper of civilization, absorbing what is most superficial and undesirable. Yet some will say, Why not plant all we can? What can be the harm of raising the intellect in some cases if we cannot do it in all? The harm is that you manufacture idiots. Some of the peasantry are taught to read and write, and the result of this burden which their fathers bore not is that they became fools. I cannot say this too plainly: an Egyptian who has reading and writing thrust on him is, in every case that I have met with, half-witted, silly, or incapable of taking care of himself. His intellect and his health have been undermined and crippled by the forcing of education. With the Copt this is quite different; his fathers have been scribes for thousands of years, and his capacity is far greater, so that he can receive much more without deterioration. Observation of these people leads to the view that the average man cannot receive much more knowledge than his immediate ancestors. What, then, it may be asked, can be done to elevate other races? How can we benefit them? Most certainly not by Europeanizing them. By real education, leading out the mind to a natural and solid growth, much can be done, but not by enforcing a mass of accomplishments and artificialities of life.

"Our bigotted belief in reading and writing is not in the least

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justified when we look at the mass of mankind. The exquisite art and noble architecture at Mycenæ, the undying song of Homer, the extensive trade of the bronze age, all belonged to people who never read or wrote. The great essentials of a valuable character — moderation, justice, sympathy, politeness and consideration, quick observation, shrewdness, ability to plan and pre-arrange, a keen sense of the uses and properties of things — all these are the qualities on which I value my Egyptian friends, and such qualities are what should be evolved by any education worth the name. The greatest educational influence, however, is example. This is obvious when we see how rapidly the curses of our civilization spread among those unhappily subjected to it. The contact of Europeans with lower races is almost always a detriment, and it is the severest reflection on ourselves that such should be the case. It is a subject which has given much room for thought in my own dealings with the Egyptian peasant, to consider how this deleterious effect is produced, and how it is to be avoided. First, it is due to carelessness in leaving temptations open to natives, which may be no temptations to ourselves. To be careless about sixpence is as demoralizing to them as a man who tossed sovereigns about the street would be to us. If a man or a Government defrauds, it is but natural to the sufferer to try and recompense himself by any means available, and thus an interminable system of reprisals is set up. Such is the chronic state of the East at present among the more civilized races. The Egyptians are notorious for their avarice, and are usually credited with being inveterate money-grabbers; yet no sooner do they find that this system of reprisals is abandoned and strict justice maintained than they at once respond to it; and when confidence has once been gained, it is almost as common to find a man dispute an account against his own interest as for himself, and scarcely ever is any attempt made at false statements or impositions. Such is the healthy response to straightforward dealing with them.

"It is the business of anthropology to step in, and make a knowledge of other civilizations a part of all decent education. The origin and utility of the various customs and habits need to be pointed out, and in what way they are reasonable and needful to the well-being of the community. And, above all, we ought to impress on every boy that this civilization in which he grows is only one of innumerable experiments in life that have been tried; that it is by no means the only successful one, or, perhaps, not the most successful that there has been; that there are many other solutions of the problems of community and culture which are as good as our own, and that no one solution will fit a different race, climate, or set of conditions. The highest form of this perception of other existence is reached in the best history writing or fiction, which enables the reader to strip himself for the time of his prejudices and views of life, and re-clothe the naked soul with an entirely different personality and environment. Here we run against a special bigotry of the purely classical scholar, who looks on ancient literature as a peculiar preserve solely belonging to those who will labor to read it in its original dress. No one limits an acquaintance with Hebrew, Egyptian, or Arabic authors to those who can deal with those tongues; and Greek and Latin authors ought to be as familiar to the English reader as Milton or Macaulay. What seems to be the most practical course would be the recognition of civilization or social life as a branch of general reading to be stimulated in schools, and encouraged by subsequent inquiry as to the extent to which it is followed and understood, without making it an additional fang of the examination demon. The books required for such reading should cover the life of Greece, Rome, Babylon, Egypt and Mexico in ancient times; and China, India, Persia, Russia, Spain, and one or two low civilizations, such as the Andamans and the Zulus, in modern times. Neither histories nor travels are wanted for this purpose; but a selection of the literature which shall most illustrate the social life and frame of the community, with full explanation and illustrations. We need not to excite wonder, astonishment, or disgust, but rather to enable the reader to realize the daily life and to live in the very minds of the people. Where no literature is available, a vivid study of the nature of the practical working of their civilization should take its place."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE LIBRARY: THE PLAYERS' CLUB-HOUSE, GRAMERCY PARK, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print issued with International and Imperial Editions only.]

HOUSE FOR DR. LEVI I. SHOEMAKER. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

STABLE FOR CHESTER W. BLISS, ESQ., SPRINGFIELD, MASS. MR. GUY KIRKHAM, ARCHITECT, SPRINGFIELD, MASS.

A WAYSIDE SHRINE.

DESIGN FOR A PROPOSED HOTEL. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

THIS drawing was hung at the spring exhibition of the Architectural League of New York.

BASE OF FLAGSTAFF FOR THE CATARACT CONSTRUCTION COMPANY, NIAGARA FALLS, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.; MR. F. W. MACMONNIES, SCULPTOR.

THE TERRACE: HEIDELBERG CASTLE.

SEE article on "German Castles," elsewhere in this issue.

[Additional Illustrations in the International Edition.]

THE GRILL-ROOM: THE PLAYERS' CLUB-HOUSE, GRAMERCY PARK, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

RECEPTION-ROOM OF THE SAME.

[Gelatine Print.]

POSSIBLY there is no Club-house in New York that shelters so much heart-burning, possibly there is none that is the temporary home of so much spontaneous generosity as that which, in the semi-retirement of Gramercy Park, is at once the memorial of Edwin Booth and the place of resort of those who seek to elevate the stage. It is merely a former dwelling-house of commonplace exterior character, which has been somewhat remodelled and largely re-decorated and wholly re-furnished to adapt it to the needs of its somewhat itinerant membership. It is homelike, cosy and full to overflowing with the relics and souvenirs of that most lovable class, the actor *de pur sang*. While its real interest and charm centres about the actors themselves, there is enough of architectural character in the remodelled interior to entitle the building to a place in this series.

THE NORTH DRAWING-ROOM, HALTON, TRING, ENG.

YEW COURT, SCALBY, ENG. MR. FRANK A. TUGWELL, ARCHITECT.

THE views published illustrate two fronts of a house recently erected at Scalby, near Scarborough, for Mr. J. A. Cooke, The Holt, Scalby. The present building is an entirely new erection, with the exception of 8 feet of the basement octagon. It occupies the site of a small house which had become past repairing, and so was pulled down, but the gardens and boundary-wall were left untouched.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

AN ABSURD SCHOOL-HOUSE COMPETITION.

September 21, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — If you should deem it to the best interests of all concerned, will you kindly have the following circular of competition and "open letter" published in your journal together with some words of your own?

PITTSBURGH, PA.

TO THE ARCHITECT: —

Dear Sir, — The Board of Highland Schools propose to have erected a school building on lot situated on Margaretta Street, 19th Ward, City of Pittsburgh, for which competitive plans have been called for. The building to contain twenty school-rooms on the first and second floors, an auditorium on the third floor; also to have a Board Room, Principal's Room and Teacher's Room, as may be conveniently arranged. The building to be of brick with stone trimmings; lot about 215 feet frontage on Margaretta and 120 feet deep and level. The location is good for school-building and is in the residence part of the city. On either side and front are streets; on the back part of lot and facing on a street there is now an eight-room school-building which is to remain, but does not cover any part of the lot 215′ x 120′ named. The proposed structure to front on Margaretta Street and is to be main school-building of the ward. The entire cost complete, ready for occupancy, exclusive of the furniture, not to exceed $75,000. The Board does not make any suggestions as to design, leaving that to the

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architect to submit that which may be appropriate. Floor and elevation plans should be sent to the Highland School Board, Margaretta Street, Pittsburgh, Pa., on or before ——, 1895. Yours truly,

D. A. STEVENSON, *Secretary.*

AN OPEN LETTER.

D. A. STEVENSON, ESQ., *Secretary Highland Sub-District Schools, Pittsburgh, Pa.:* —

Dear Sir, — Your circular of instruction to architects for your proposed new school-building, has just been received. The "instructions" seem very clear and explicit so far as they go, but surely there must be a mistake somewhere. Nothing is said in the circular about the number and kind of drawings required, the scale to which they are to be drawn, whether in black ink, line or color, whether a perspective is required, if so, from what station-point and how rendered. These are matters that will greatly affect the cost to competing architects of preparing competitive drawings, as well as possibly give some one the advantage of the "tricks of rendering."

You do not name the seating-capacity required for school-rooms and third-story auditorium; you do not say whether there will be First, Second, Third, etc., Prizes, or, in fact, whether even the design of any competitor will be accepted, and he be allowed to execute the work at the usual and proper rate of compensation. Can your Board be aware of the fact that by far the greater number and most successful — when adaptation to purpose is taken into account — of the public school-buildings of our country are erected by capable and experienced architects of direct selection by the various Boards? The writer is engaged at this very time, in the city in which he lives and practises, upon two public school-houses whose aggregate cost is about $60,000. He believes that his "direct selection" by the School Board at this time comes simply and solely through the said Board's having employed his services in the erection of a large school-house some four years ago. Five per cent has been paid and earned for architectural services on these buildings.

Does your Board realize that it is likely that several thousands of dollars' worth of labor will be rendered for which, if the above circular tells all, the unfortunate authors cannot hope to receive anything beyond their labor for their pains? It is presumed that your Board wants the best ideas obtainable for this $75,000 school-house; surely they cannot think real architects the innocent gudgeons the above competition programme would seem to imply, therefore they really mean to spend the tax-payers' money on third or fourth rate ideas and administrative services.

Lest you may set the writer down as a disgruntled competitor for architects' honors, permit him to say that the beginning of his architectural experience, when a callow youth, dates back twenty-one years, but from that day to this he has never been engaged in an architectural competition of any kind; nevertheless, he believes that architectural competitions as to merit of plan and design may be a "necessary evil," but only when hedged about with a well-digested code and a clean, experienced, professional adviser; last, but not least, some bait on the hook in the shape of several substantial money prizes to mark the distinctions of merit, as well as help pay the cost of the labor involved in preparing the studies; the man placed first to carry out the work; subject, of course, to proper restrictions as to administrative experience.

In conclusion, while I shall not be a competitor for the honors in this case, I shall, in common with many others, await with interest the outcome of your competition as set forth in the circular herewith appended. Respectfully, ARCHITECT.

A QUESTION OF COMMISSION.

MONTREAL, Sept. 12, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A special case of dispute between a client and his architects stands as follows:

First. The architects are practising outside of the United States.

Second. The proprietor comes to said architects' office and orders plans to be made for a building amounting to, say, $50,000. The architects agree to make the plans and specifications ready to ask for tenders.

Third. In case the execution of plans and specifications would be found too high, the architects agree to remodel same, and even to make new ones, until they reach the desired amount.

Fourth. The architects have fulfilled their part of the agreement, as per second item, but the tenders as called for by the proprietor himself, without the architects' assistance amount to over $100,000.

Fifth. Without notice of any kind, the proprietor decides to have plans made by others, and even gives the contract and work, and writes to the former architects, telling them that their services are no more required, offering them a compensation, without stating the amount.

Sixth. There is no written agreement between the parties, but several letters, referring to plans and specifications have been exchanged and, amongst them, some from the architects inquiring about the progress of the bids, in order that they may proceed with the work, or modify the plans accordingly.

As the architects intend to sue said proprietor, what would be the most logical proceeding, and according to your views, what should their chances be, considering what has been exposed in preceding items. By answering, you will oblige,

AN OLD SUBSCRIBER.

[OUR idea is, decidedly, that the architects should abandon all idea of suing their client, and accept whatever he is willing to give them, with such good grace as they can command. We cannot believe that they would recover a penny from him in a court of law. They say that they were employed to make plans and specifications for a building to cost $50,000, and that if the execution of their design would cost more than that, they were to have the privilege of remodelling them This is well enough, but there is more in it than this, and they forget to add that the contract of employment implied that they were to give reasonably skilful and careful service in preparing the plans. Now, on their own statement, they made designs for a $50,000 building which could not have been carried out for $100,000. The question for the court to decide would then be, not whether their employer carried out his contract, but whether they fulfilled theirs; and we do not believe that there is a judge or a jury in America who would say that they did. They say that the owner obtained the estimates, instead of them; but, in the absence of fraud on the owner's part, it is not likely that the bids given to him would vary materially from those given to the architects. At least, no jury would believe that there could be such a variation as to give reasonable color to the claim that the architects had really designed such a building as they were employed to design. If then, being employed to plan a building to cost a definite amount, they, without interference on the part of their employer, planned one costing more than twice the specified sum, their employer would probably be held in law to be entitled to reject their service, as having been rendered without the care and skill which they, by implication, agreed to devote to him; and, unless he chooses to adopt and use some portion of their work, he would not be bound to pay them anything for what they have done.

It is understood, of course, that we do not pretend that the architects may not have rendered their client great benefits; but we can say without hesitation that it would be useless to attempt to present these to the minds of a jury. In courts, the money question is always paramount. If a man wants a $50,000 building, the man who designs a $100,000 one for him does him no service, and shows, in law, no reasonable care and skill, though elevations may show a genius which would cast Ictinus into the shade.

As we so often have occasion to say, let the architects put themselves in their client's place, and they can form a pretty good idea of what the courts will do for them. Suppose that one of them has $50 to spend on a carriage. A certain dealer undertakes to have one built for him at that price. When the carriage is done, the bill is over $100. Does he consider himself bound to take the carriage and pay for it? Of course not. And if, after thus wasting his time to no purpose, the dealer who had misled him should send in a bill for his "services," would he pay it? We venture to say that he not only would not pay the bill, but would transfer his order to another dealer, and not only he, but all his friends, and any judges or juries who had to pass upon the matter, would consider that he was entirely justified in so doing. This, as we understand our correspondent's letter, is something like the story of their transactions with their client; and, they will be far better off in the end by trying to keep his friendship, than to waste money, time and temper in a contest which must end in defeat. — EDS. AMERICAN ARCHITECT.

THE PROPOSED AMENDMENT TO THE A. I. A. BY-LAWS.

PHILADELPHIA, PA.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I have before me one of the letter-ballots on the proposed amendment to Article IV, Constitution A. I. A., and am rather at a loss to know what to do with it. If I vote yes or no, just from my own judgment, I may find out afterwards that there are strong arguments on the other side, which might have caused me to vote differently had I heard them before.

If a debate were possible a clear idea of the situation with the advantages and disadvantages of either side might be arrived at and an intelligent expression of opinion might result. But as that is impossible under the circumstances, I will, with your permission, give my views on the subject, in hope that some of your readers may criticise them, and thereby we may determine on the best course to pursue.

The article as proposed reads:

ARTICLE IV.

The officers of the Institute shall be a President, a First and Second Vice-President, a Treasurer, a Secretary and an Executive Committee.

The object of the amendment seems to be to get rid of the present Board of twenty-nine Directors, and substitute one of seven (called the Executive Committee) and I am willing to believe that the change is desirable as it is proposed by those who know the difficulties of the present system. But I do not think that a Committee can properly be included among the Officers of the Institute. The present article does not so include the Board of Directors.

Would it not be better and simpler to abolish the Executive Committee and reduce the number of Directors from twenty-four to four, electing them annually and assigning to them the duties now devolving on the Executive Committee? This would obviate the necessity of most of the proposed amendments to the by-laws, and leave them and the constitution in better shape. The amendment would then take this form:

ARTICLE IV.

Section 1. The officers of the Institute shall be a President, a First and a Second Vice-President, a Treasurer and a Secretary.

Sect. 2. There shall be a Board of Directors, consisting of seven Fellows, of whom the President, Secretary and Treasurer of the Institute shall be three.

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The necessary changes in the by-laws abolishing the Executive Committee and providing for the election of four Directors at each annual convention, all to serve for one year, etc., would then be few and simple; as the Executive Committee is only mentioned three times in the by-laws, and no special duties are assigned to it.

As a matter of taste, I also think that "Board of Directors" is a more dignified and appropriate title for the governing body of the Institute than "Executive Committee."

Respectfully, HENRY A. MACOMB, *F. A. I. A.*

EXHIBITIONS

BOSTON, MASS.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association: opens October 2.

NEW YORK, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.

NOTES AND CLIPPINGS

THE PACCA LAW CAUSES A LOCK-OUT. — A number of the princely palaces at Rome are now in a state of siege. This is due to what is known as the Pacca law, which renders it a penal offence to sell for export any art treasure without having previously obtained the sanction of the Government and paid heavy dues for the privilege. The object of this statue was to prevent all the ancient masterpieces in the country from being converted into cash by the impoverished nobility and dispersed in foreign lands. The nobles, it may be remembered, bitterly protested against this law as an infringement of their inherited rights of proprietorship of the collections formed by their ancestors. They claimed that their pictures and their statues are their private property just as much as any stocks or bonds which they might possess and that the Government had no right to interfere with what they did with their own. For a time it was not believed that the law would ever be enforced, but when Prince Sciarra Colonna sold half a dozen of the old masters of his gallery to Baron Rothschild, of Paris, for a large sum, he was prosecuted by the Government and condemned to imprisonment and to pay a fine. Fortunately, he had taken the precaution of establishing himself at Paris, and a demand for his extradition was thereupon made, which the French Government refused to grant. The patricians of the Eternal City have now retaliated by closing their great galleries and collections to the public, and some of the finest galleries have even been locked to every one for more than a year. At first this was regarded merely as a piece of petty spite on the part of the owners, but now information has reached the Government which leads it to believe that the closing of the galleries has taken place with the object of enabling the noble proprietors to dismantle their walls and quietly get rid of their pictures without attracting the notice of the public or of the authorities. The Government does not care to go to the length of obtaining search-warrants in order to ascertain if the statuary and painting are still there. Indeed, it is doubtful whether it could legally do so; so it contents itself with posting detectives to keep a close watch on all the great galleries, especially since the discovery the other day of a superb piece of ornamental balustrade already packed for shipment to the United States, in the store of one of the leading dealers in antiquities in Rome. The balustrade in question, which possesses a world-wide celebrity as an artistic masterpiece, had been quietly and surreptitiously removed from the old patrician palace of which it formed one of the most precious ornaments. The dealer and the princely owner of the palace whence the balustrade was removed, are to be criminally prosecuted on a charge of infraction of the Pacca statute. But the law moves slowly in Italy, and it is probable that several months — possibly a year — will elapse before they are finally brought up for sentence.— *Marquise de Fontenoy in the Philadelphia Press.*

A LONDON REFUSE-DESTROYING PLANT. — On Tuesday last the contract was signed for the building of a lofty chimney, constituting the first portion of a very spirited scheme which the Shoreditch Vestry are about to carry out. They have purchased a piece of land upon which the City of London Iron Works formerly flourished in the neighborhood of Hoxton Square, and upon this they are going to erect a dust-destructor on the newest principles. It has been abundantly demonstrated that the furnaces in which the refuse is destroyed may very advantageously be employed for the generation of steam or other purposes. The Shoreditch Vestry have resolved that in their parish the destructor shall do a double or rather a treble duty. It is to destroy useless refuse, to generate steam for lighting the parish by electricity and supplying electric-power to those who need it, and at the same time it will afford a supply of hot water for public baths and wash-houses. The chimney-stack referred to will be the commencement of an experiment which it is believed will be unique. It will be 150 feet high, and around the foot of it will be the electric-light and power station, the baths and wash-houses, and on a corner of the same plot of ground will be a large and handsome public library. — *London Daily News.*

ROMAN GARDENS. — The prodigious gardens of Lucullus, who introduced the cherry, the peach and the apricot from the Persians, were derided by his Roman friends for their extraordinary sumptuosity. They are related to have consisted of immense artificial towers, large sheets of water, gigantic edifices jutting into the sea, and mountains raised where no hill had existed before. Such an example might be ridiculed by some, but was certain to be followed by others whose taste for splendor and profusion was supported by unbounded wealth, and accordingly the gardens of Sallust, of the emperors Nero and Hadrian, and of many of their subjects, are doubtless to be classed in the same order as those of Lucullus. It is, however, to be remembered that such gardens were rather more similar to an English park and garden combined than to a mere garden, in the modern sense of the word, and moreover were so uncommon as to be looked upon with wonder by the people among whom they are created. A common Roman garden must have been a very different place if we are to take the description given by Virgil as at all a faithful sketch, for he speaks of nothing but endive (*intyba*), celery (*apium*), melons? (*cucumis*), narcissi, acanthus, roses, ivy and myrtles. That they had various trees bearing fruit as well as the common wild timber of the country and many different kinds of flowers must of course be admitted, but that all gardens up to the most flourishing period of the Roman empire must have been much alike in respect to the plants they contained, is manifest from the fact that hardly more than seventy plants of all descriptions are noticed by this poet, although he wrote professedly upon rural affairs. It is true that the Romans carried their passion for flowers so far that it became necessary to restrain it by sumptuary laws, and that cases of extreme profusion in the use of them are mentioned by historians. The institution of Floralia, or flower-feasts, the universal passion for garlands, the reproaches addressed by Cicero to Verres for having made the tour of Sicily in a litter, seated on roses and decked with festoons of flowers, are a sufficient evidence of this taste having been carried to an extent unknown at the present day; to say nothing of the prodigality of Heliogabalus, or of Cleopatra, the latter of whom is said by Athenæus to have paid upwards of 200*l.* (an Egyptian talent) for roses expended at one supper. But notwitstanding this, the variety of plants that were cultivated in the gardens of both Greeks and Romans must have been extremely small. Theophrastus speaks only of roses, gilly-flowers, violets, narcissi and iris, as used for decoration, to which the larkspur and gladiolus (*hyacinthus*), with the white lily, and a few others may be added. The great object of their admiration was roses, which were forced by plates of talc (said to have been as much as 5 feet long; but it is more probable that these *pecularia* were sashes five feet long, glazed with talc) being placed over bushes watered with warm water. Pliny in his "*Natural History*," does not enumerate above one thousand plants of all descriptions, a very small part of which were objects of cultivation. — *The Architect.*

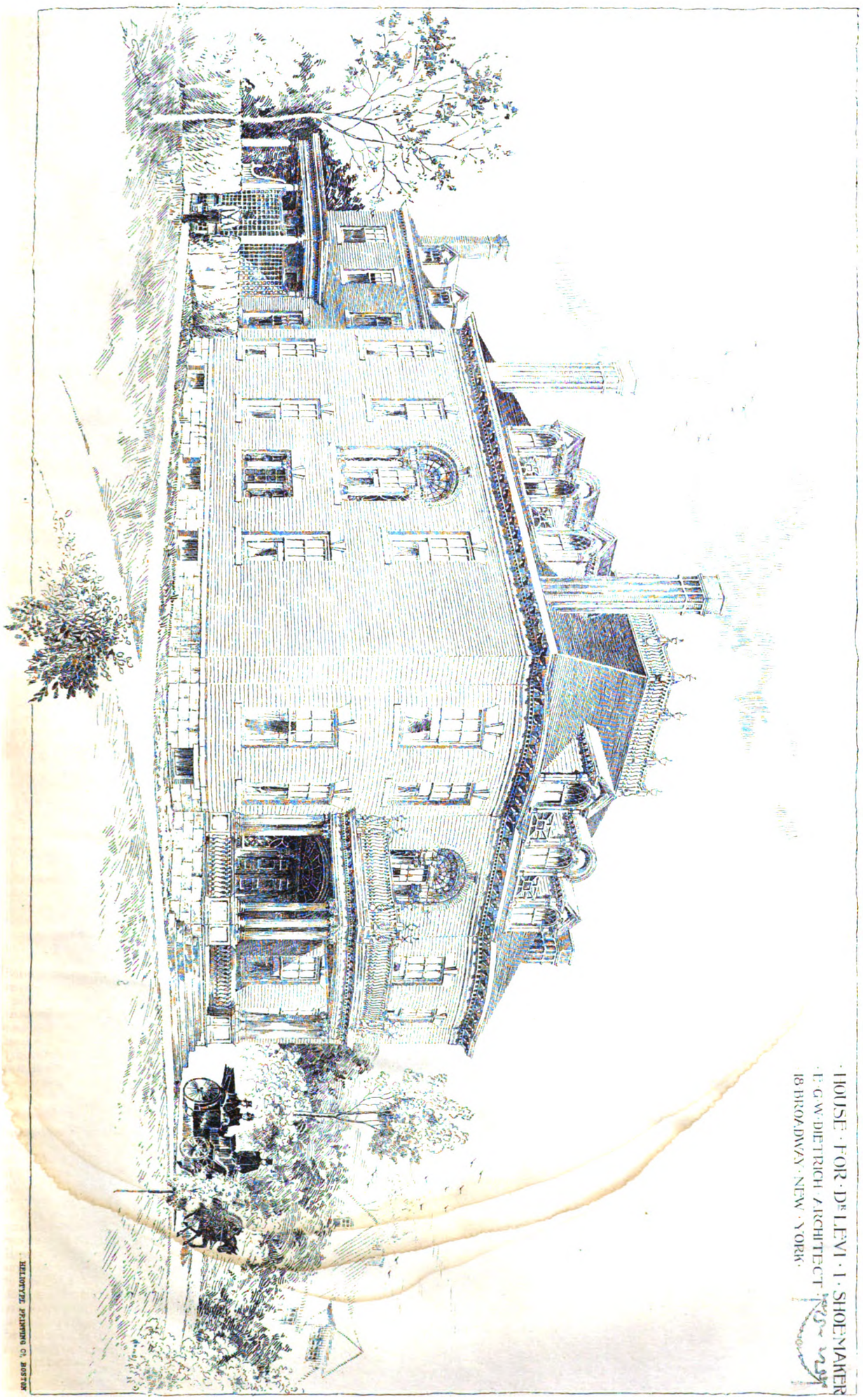
AN ADVENTURE WITH A MUMMY. — A French archæologist travelling among the Andes in search of knowledge and specimens had a great desire to explore some caves in the sides of the precipices. They were doubtless ancient tombs and would probably yield him a treasure. He selected a favorable spot, therefore, rigged a sort of chair or seat between two leather cords and engaged two Indians to let him down from the brow of the precipice. "A descent of 300 feet made in this way," he tells us "is extraordinarily long." However, he reached the cave in safety, and on forcing a passage into it was rewarded by finding two skulls and a mummy, "thoroughly dry," he says, "and pretty solid." He passed a string through the eyeholes of the skull and attached them to his belt. Then he took the mummy in his arms and signalled to the Indians to draw him up. With his heels he defended himself against the jutting rocks, and in a few minutes was almost on a level with the top. The Indians knew nothing about his load. Just when the yellow skull of one of their ancestors appeared before their eyes the idiots gave a start of surprise. The Frenchman thought they must have let go the cord. "It was the affair of a second," he writes. "What passes in the brain of a man at such an instant is indescribable. I did not drop a yard, but I experienced all the horror of a man rapidly falling through space. My hands let go the mummy, and while, covered with a cold sweat, I was helped over the edge of the cliff by the Indians, the mummy bounded from rock to rock and landed in bits at the bottom of the chasm." He overwhelmed the Indians with invective, but to no purpose. Such dead men, they assured him, if disturbed in their sepulchre, had the habit of kissing the Indians who perished infallibly under their deadly breath. One of the two declared that his own father had died in that way. The other assured the Frenchman that at the moment when the head of the mummy showed above the edge of the rocks it opened its mouth. If it had not luckily fallen into the abyss it would have cursed them forever. — *Pittsburgh Dispatch.*

ARTIFICIAL MARBLE. — "Nine-tenths of the marble-topped tables and so on — what I might call furniture marble — seen in this country are made of artificial marble," said a man in the trade. Thousands of tons of this mock marble are made annually, and even men in the trade can scarcely tell the difference between the real and the false article, for the markings, or marblings, go wholly through the block, and are not merely superficial. The basis of the whole is a combination of limestone and chalk, which, chemically treated, can be made of any shade desired. The artificial marble in the rough is placed in a water-bath, and upon this is sprinkled a sort of varnish, consisting of sesquioxide of iron, gum and turpentine, and all manner of marbled designs are produced when the turpentine is broken up by the addition of water. Any pattern of marbling can be produced to order. Once such pattern appears, the air is expelled from the block and the colors are fixed by the immersion of the stone in sulphate and warm-water baths, and then another bath of sulphate and zinc so closes up the pores and hardens the stone that it acquires the density of the natural article, and can be cut and polished in the same manner. — *Atlanta Constitution.*

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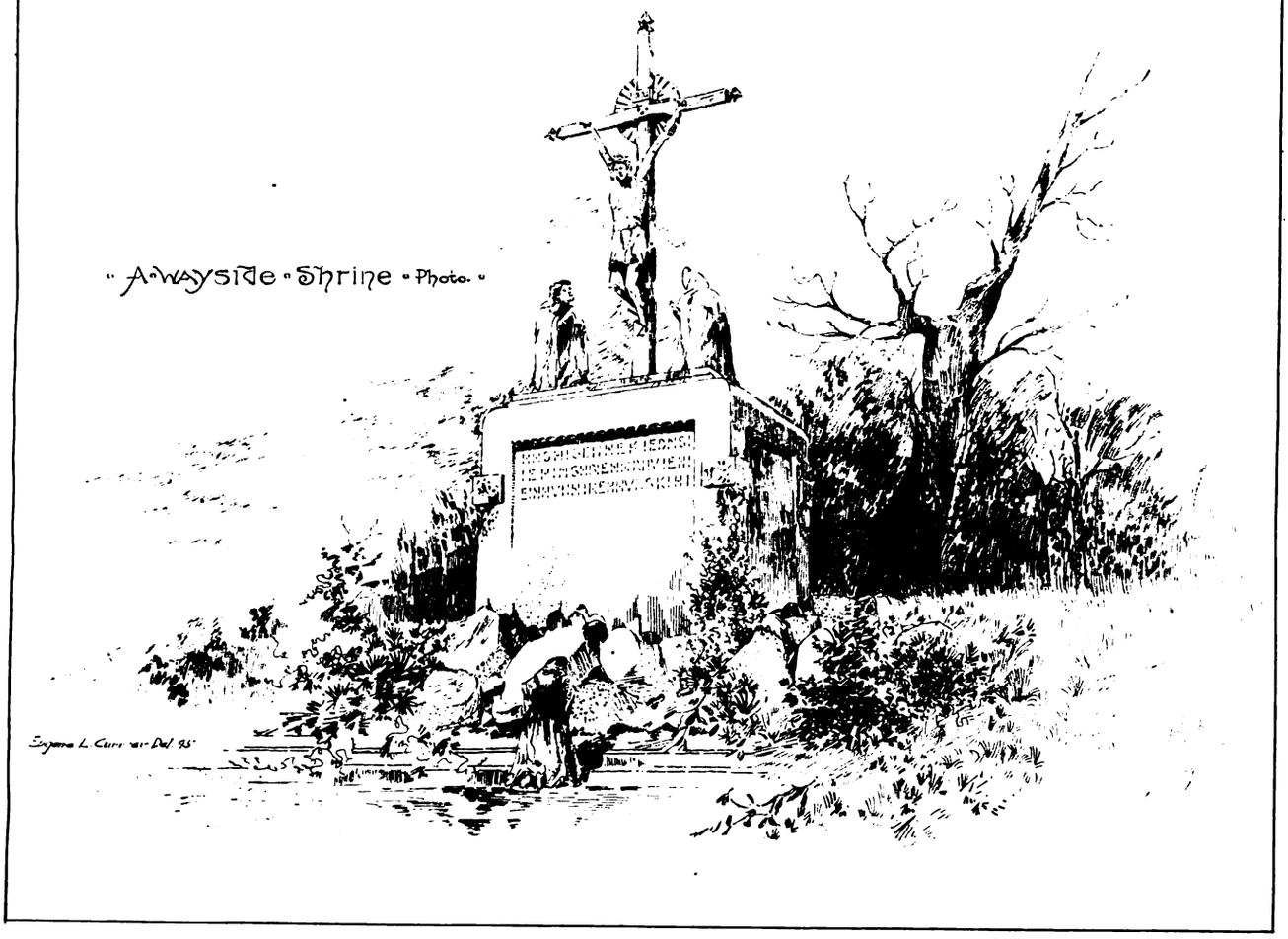
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"A Wayside Shrine" Photo.



Eugene L. Curtis del. 95



STABLE FOR MR CHESTER W BLISS AT SPRINGFIELD MASS GUY KIRKHAM ARCHITECT

G.K. del 1895

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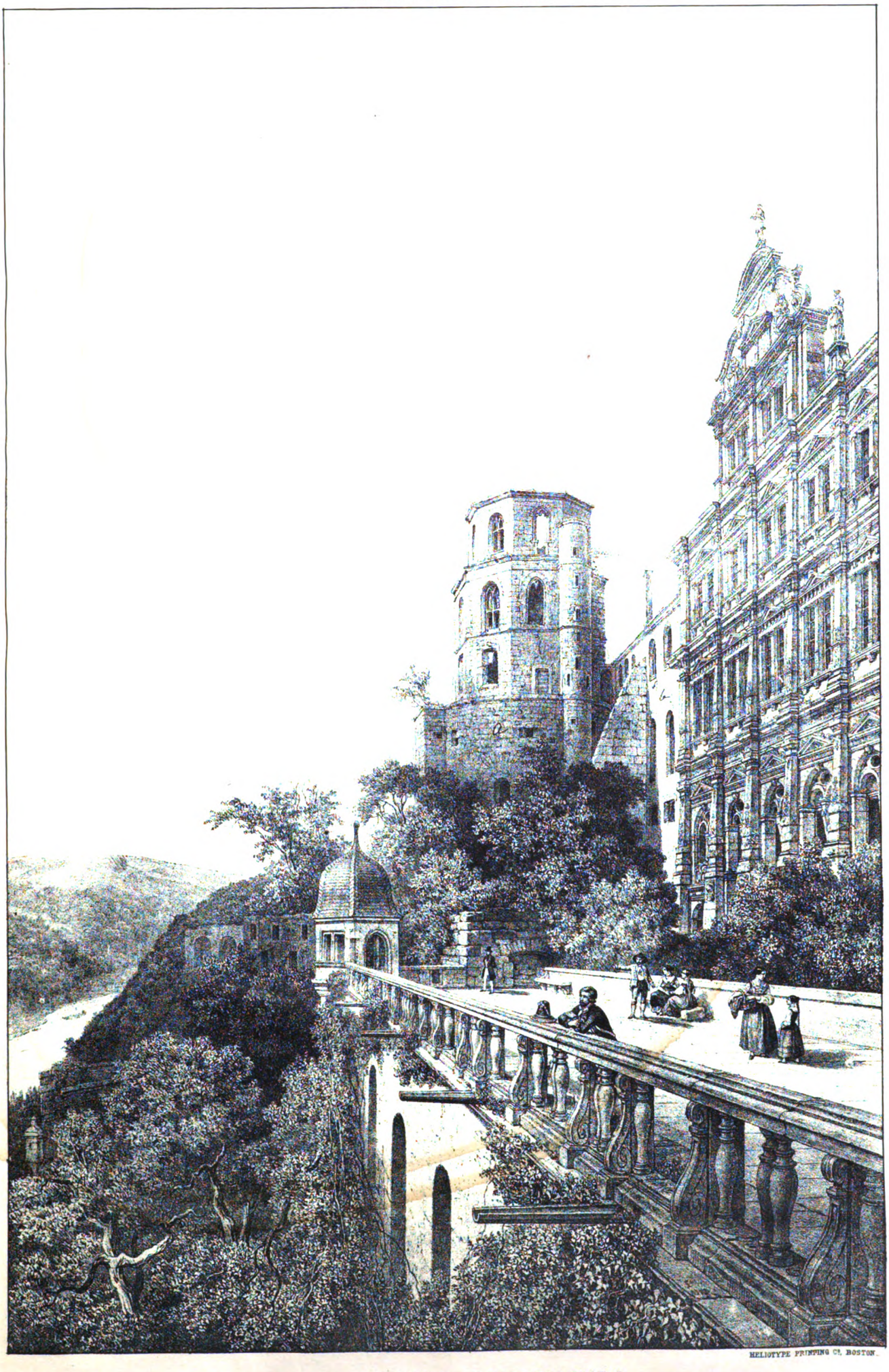
FLAGSTAFF FOR THE CATARACT CONSTRUCTION COMPANY, NIAGARA FALLS, N. Y.

McKIM MEAD & WHITE. Architects. F. W. MacMONNIES. Sculptor.

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FIG. 38. THE TERRACE: HEIDELBERG CASTLE.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. L

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OCTOBER 5, 1895.

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THE New York grand jury has found indictments for manslaughter in the second degree against Charles P. Behrens, the architect of the collapsed Ireland Building; Dennis E. Buckley, the inspector; Edward J. Youdale, the clerk, George H. Parker, the contractor, Thomas Walker, the superintendent, and Thomas Murray, the foreman mason; and they will be tried in due course. We have no desire to anticipate judicial proceedings, but it seems to us that even grand juries, like the rest of the world, find it easier to blame people indiscriminately than to sift evidence carefully enough to find who really deserves it. Concerning the fall of the Ireland Building, it seems sufficiently proved, by the testimony at the inquest, that the direct cause of the catastrophe was the reduction in the thickness of the concrete footing of the column which gave way, and the collapse of the column was the natural result of reducing the resistance of the footing on which it stood to less than one-third that which it would have had if it had been carried out according to the architect's plans and specifications. This being so, the question is, Who made this change? And if it was made by the direction of any person, who was that person? In that person, as every thinking man must admit, is to be found the culprit who is alone responsible for the deaths of the unfortunate workmen who perished in the crash. So far as we have been able to follow the evidence, there is not the slightest reason for supposing that either the architect or the district inspector knew anything about the wilful departure from the plans and specifications which had been approved by the Department. Of course, the idea of the grand jury is that they ought to have known of it; but, even supposing that reasonable care and skill on their part required that they should dig around every trench in which concrete had been laid to ascertain whether the thickness of the concrete agreed with the specifications, there is, to us, something monstrous in the idea that a failure to do so made them *particeps criminis* with the person who knowingly and wilfully perpetrated the crime which they failed to detect. That an architect who has carefully and skilfully designed a piece of construction may be held responsible for the contractor's wilful variations from his design is a notion about as well calculated for the encouragement of reckless manslaughter on the part of contractors and their men as any that has ever yet been offered to the community; while the similar idea, that an official is to be himself punished as the author of the crimes which he fails to detect, is one over which the real criminals will shed tears of joy, for it means that, where it prevails, evil intent is to be accounted as nothing, but those who perpetrate a crime, and those who endeavor, unsuccessfully, to prevent it, are to be included in the same indictment, and placed in the dock together for trial on the same charge, with, at least, a fair chance that the real criminal will escape entirely, or, at most, be condemned only to share the punishment of the others.

WE publish in another column the substance of the very interesting bequests made to the City of Galveston, Texas, by the late Henry Rosenberg, who died in 1893. We have often spoken of the artistic greatness which, as we believe, is in store for this country, mainly as a consequence of the generosity of our people in giving their time and money for objects of public interest. Hitherto, this generosity, as was natural in a community necessarily devoted to practical pursuits, has been, as a rule, devoted to promoting works of utility; but the æsthetic feeling, which exists among us in a high degree, is beginning to assert itself, and, by the side of the orphanages and hospitals which bear testimony to the public spirit of Americans, are occasionally seen, even now, works of pure art, dedicated by citizens to their fellow-citizens. Among these enlightened benefactors of their country, Mr. Rosenberg seems to have been one of the most judicious, and it would be difficult to suggest a disposition by which a large property could be made to do more for the mental and moral elevation of a community than that detailed in his will. We once knew a very benevolent man, who, after a life filled with acts of kindness, left most of his property for public purposes. One day, during his last illness, after reflecting, as it seemed, with his usual conscientiousness on his plans for disposing of his property, he observed to some one near, "It is hard to make money, and still harder to keep it, and hardest of all to do any good with it." There is no doubt that this observation exactly expresses what is in the minds of hundreds, or, more probably, thousands, of rich Americans, whose relatives are comfortably provided for, and who, having neither occasion nor desire for purchasing rank or station for their families, sincerely wish to make the fruit of their patience, temperance and self-denial beneficial to their fellow-men, and it is pleasant to find that in the South, where large fortunes are comparatively rare, the question of utilizing them to the best advantage is quite as conscientiously and successfully studied as in the North.

MR. EDWARD ATKINSON has recently urged again upon the Mayor of Boston the admirable plan for placing stand-pipes and hydrants on the roofs of high buildings, as a protection to property in the neighborhood, which he has so long advocated. With the multiplication in the city of high buildings, surrounded, in most cases, by structures of very dangerous character, the subject has taken a renewed importance, and the Mayor and Fire Commissioner, as well as the public, seem to have received the communication with favor; but, in the opinion of the Corporation Counsel, the city authorities have no power, either to put up stand-pipes on the walls of buildings, or to compel private owners to do so, and the Mayor appears to think the case hopeless, unless special legislation can be secured. At the risk of repeating what we have said at least once before, we will observe that the change which Mr. Atkinson thinks so desirable might be made all through the business part, not only of Boston, but of every other large city in the United States, within six months, without any legislation, and without any expense to the municipalities concerned, by the simple method of inducing the underwriters' associations to announce a reduction in insurance rates on property so protected, approximately commensurate with the diminution in the risk of loss from fire which Mr. Atkinson thinks would be the result of carrying out his suggestion. It is not so very many years since the New York Underwriters' Association voted to make a certain reduction in rates where stand-pipes were put up on the front walls of business buildings, with couplings for fire-engine hose at the bottom, and outlets at every story, and above the roof. Immediately, the owners of stores in the dry-goods district began putting up such stand-pipes, not only on new buildings, but on old ones, and architects were instructed on no account to omit

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them from their specifications. By-and-by, the Underwriters' Association discovered, as it said, that the stand-pipes were filled up, or defective, or in some mysterious way unsuited to the duty that they were intended for, and the reduction of rates allowed for them was revoked. From that moment the erection of such pipes ceased. Architects were instructed to leave them out of their specifications, and no more money was spent on a device which the underwriters themselves had ceased to approve. It is not likely that the Boston merchants and real-estate owners, many of whom have interests in New York, have forgotten this lesson, and, although the Fire Commissioner charges them with "neglect of duty," in not providing just the appliances which they have seen alternately approved and condemned by the rate-making portion of the underwriters, it is altogether likely that they will wait for some argument more tangible than mere abuse before incurring an expense which, as they may be told, six months hence, the underwriters consider useless.

THE French Courts have been turning their attention to the "scab" question, in its concrete form, with a vigor which promises well for the future. It will be remembered that, ten years ago, official France was almost as much given up to fawning upon the trade-unions and their tyrants as England has been since; and, in 1884, a law was passed, repealing the Article 416 of the Code Penal, which provided penalties for conspiracy to proscribe or injure any person by preventing him from carrying on his legitimate business. The law of 1884 was unquestionably intended to facilitate the systematic persecution and oppression by which the trades-union leaders gain and maintain their power, and it has been constantly utilized for that purpose. Now, in France, as here, the victims of this infamous tyranny are beginning to find courage to complain, and there, as here, the courts listen to their complaints, unterrified by the threats which the tyrants mutter against them. Two recent cases, decided by the Court of Appeals, one at Lyons, and the other at Paris, are interesting, not only by their circumstances, but for the vigor with which the Court pronounced its opinion of union practices. In the Lyons case, a man named Bernichon, a brass-worker by trade, was employed in the factory of one Curbillion. Curbillion's factory was "struck" by the union, and Bernichon lost his place. He had been a member of the union, but had fallen behind in his dues, and had been expelled on that account. On applying for work elsewhere, he was informed that only union men could be received. At the factory of M. Blanc, he was rejected by the foreman without his master's knowledge on account of his not having the union ticket, but M. Blanc testified that he had twice been compelled, by delegations from the union, to discharge non-union workmen, so that he would not have taken him if he had known of his application. M. Mallet, the head of another factory, testified that Bernichon applied to him, and that he would have taken him, but his foreman told him that Bernichon was not a union man, and that all the other workmen would strike if he came in; and, having had his factory previously "struck" for two years, because he had refused to discharge a foreman at the demand of the union, he was unwilling to risk any more encounters with the union, and, therefore, refused Bernichon's application. Several other brass-workers testified that they had been kept out of employment by the union, because they did not belong to it; and M. Mallet, in a conversation with the commissary of police, which was admitted as evidence, said that he could not employ non-union workmen without having all his union workmen leave him; adding that this system was as tyrannical for the workmen as for the masters, but that the latter could not help themselves. The same commissary of police testified that he had spoken on the matter with two members of the union, who said that Bernichon, finding that he could not get employment without the union certificate, had applied for reinstatement, but that he had not paid union dues for three years, and his application was refused. He was kept out of his employment in this way for two years, during which he picked up a little money by working as a laborer, and in other ways. On this showing the Court observed that, by the repeal of the penalties attached to such acts, the union could not be pursued criminally, but that the change in the penal code did not in the least abrogate the civil responsibility incurred by persons who unjustly deprive others of their rights. The testimony showed that Bernichon could earn, in his own trade, five francs and a half a day. In two years, this would amount to forty-five hundred francs. Deducting what he had been able to earn in other ways, with something for what he would probably have lost by not being constantly employed, the court estimated the remainder at two thousand francs, and ordered the President of the union to pay to Bernichon that sum forthwith, with interest from the date of the writ, and to pay into court all the costs of the original case and the appeal.

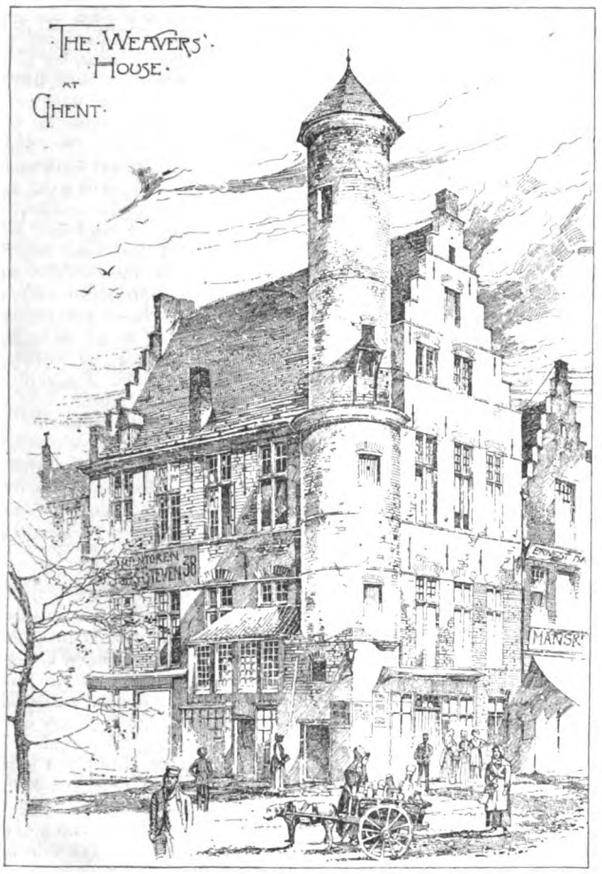
THE second case is a still more interesting one. In 1885, a certain Terrier, who was influential in the brass founder's union in Paris, took it into his head that he would like to be foreman of the shop in which he worked. The first step in the accomplishment of this object was, naturally, to get rid of the foreman who was already there. Utilizing the advantages offered by an industrial system which certain people who ought to know better profess to regard as a foretaste of the millennium, Terrier obtained an order from the union unceremoniously demanding the discharge of the foreman whom he wished to supplant. The proprietors of the shop refused to obey the order, and the shop was struck. Some of the workmen stayed by their employers, and were put on the black-list of the union, and their names published as "scabs" in the union newspaper, *La Fonderie*. One of them, named Bonnissent, seems either to have incurred the particular rancor of the union tyrants, or to have been less easily intimidated than the others, for his name was kept on the black-list for ten years. During that time, he was unable to find employment in any shop except those which were for the moment themselves under the ban of the union, and his work, in consequence, was very precarious, and interrupted by long periods of idleness, which, as the Court said, were all the more distressing, as he had four children dependent upon him. Two or three years ago, one of his sons, Victor Bonnissent, came to an age at which he could earn something, and also entered a brass-foundry. As soon as the union tyrants discovered this, they included him in their persecutions. The testimony showed that he was earning nearly four francs a day, and that his employers were pleased with him; but the union officials demanded his discharge, and they were obliged to send him away. He succeeded in finding employment in another shop, but the union hunted him out there and ordered his discharge again. Finding it impossible to get employment at his own trade, the poor boy went to work in a shoemaker's shop, and afterwards in a glass manufactory, at wages much less than he had been earning in the business for which he had been trained. At last, the idea occurred to the elder Bonnissent to seek in the courts, for himself and his minor son, redress for the persecutions which they had endured for so many years.

THE union magnates fought hard, for the final decision was given by the highest court in France; but it left no doubt of the view which the law proposes to take of the subject. After summing up the evidence, the Court said: "In "acting as it has, the Union has committed a grave fault, of "which it cannot possibly be allowed to escape the responsi-"bility. It is useless for it to pretend that it has not exceeded "its rights in inscribing Bonnissent's name in the black-list; "such a measure, taken in regard to a workman against whom "it had no legitimate grievance, constitutes the most revolting "abuse, and the most crying violation of the fundamental "principle of the liberty of work and industry. To admit its "propriety would be to confiscate, for the exclusive profit of "the unions, who would thus become, against all reason, and "all justice, the absolute masters of every trade, the individual "right to labor which our modern laws have never yet ceased "to protect with jealous care; and to reëstablish, a hundred "years after the French Revolution, and by the abandon-"ment of one of its most beneficent conquests, the oppression "of the ancient guilds and corporations in its most odious "and tyrannical form." The counsel for the union claimed that no damage had been done to Bonnissent and his son, since they were able to find employment of some kind; but the Court said that it was perfectly evident that they had been out of employment more of the time than they would have been if the unions had not pursued them, and that the son had been obliged to take less wages than he could have earned if he had been able to work at the trade for which he was trained. It therefore condemned the union to pay to the elder Bonnissent five thousand francs, forty-five hundred for himself, and five hundred for his son; and to pay all the costs of the action and appeal.

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ART IN THE MODERN CHURCH. — I.

INTRODUCTION.



From the *Building News*.

IN the following papers an attempt will be made to examine the present position of church architecture in America from the standpoint of Christian art. The building of churches consumes the energies and commands the attention of many people. The architect is, perhaps, the least interested; certainly his interest cannot be as intense as that of a minister and a congregation in the structure they are themselves building for the worship of God. And after the church has been built it continues to be to them a never-ending object of tender and loving regard. Affectionate memorials to the dead are constantly adding to its adornment; the pious offerings of some wealthy member are ever being lavished upon it; additions are made to its structure from time to time; so that once begun, it is seldom finished, in the sense of being unalterable and complete. Thus, the interest in the art of the church is continually growing and widening, and must always be a matter of the supremest interest, binding together people of many tastes and widely-diffused occupations, uniting all in one common bond of artistic and religious fellowship.

Each day brings forth new developments. Not only are our churches numerous, but a more or less extended attempt is now made to apply to them that decorative art that the popular taste of the day demands in ordinary and secular structures. Whether this so-called religious art is good and true, whether it is fitting for the Lord's house, whether it is appropriate to the buildings it is intended to set off and ornament, we shall presently inquire; meanwhile, it is proper to remark that, apart from its propriety and reality, such a feeling for art is itself significant of an increasing and fresh interest in the artistic aspect of the church, its architecture and its decoration.

Modern taste demands church buildings of a certain artistic quality. Oftentimes this quality is more decorative than artistic. Above all, it is important to note that the present movement towards artistic church-building is dictated purely by questions of taste, which has affected our churches just as it has affected our homes and our office-buildings. In no sense whatever is this movement a religious one, nor is it inspired by any religious impulse. It is true, the High-Church branch of the Episcopal Church has set up, in a certain sense, some standards of church architecture, and openly contended for beauty and art in God's temples. But the High Churchmen are not the only ones who wish for beautiful churches. Scarcely a religious body, except it to be the Society of Friends, but has now its splendid modern church that testifies to the wealth of the society and to the taste of its members. On every side, therefore, there is a vast interest in church architecture and all that pertains to it.

It is not the purpose of the present inquiry to enter into an exposition of such patent facts as these, but to plainly ask if the cause of religion is helped by these artistic attempts, and to apply to the church building and its artistic aspects the simple requirements of religious art. What these are, and how they are illustrated will presently be set forth; at the outset of our study it is sufficient to remark that the artistic and religious standard of the American church is extremely low. In the overwhelming number of examples our so-called religious art is not religious at all, in so far as it illustrates a religious feeling, a pious reverence, or a Christian fellowship in the work. Many of our churches are beautiful; certainly a number of them are costly and elaborate; often no effort has been spared to endow them with a rich and impressive art; a few even are entitled to stand upon the highest pedestal of modern art; but there is nothing religious in this, nothing holy, nothing consecrated. It does not appear to be known that a religious architecture implies a spirit of religious reverence, love, faith, hope, in structural expression; that a religious building must not only be put to religious uses, but be at least religious in aspect, even though it does not fully set forth the glory of God. We have gone far astray from this in our church-building, though it is one of the first things taught by Christian architecture, and continued to be taught for centuries, until the pronounced development of secular architecture turned men's minds from the building of churches to the building of houses. And this process has been continued so long that the primitive meaning of church architecture has been forgotten, and our church architecture has been as secularized as our house and civic architecture.

Is it necessary to argue that this is wrong? Does it require a treatise to demonstrate what should be self-evident to every Christian mind? An infinite number of opportunities have been wasted because this plain teaching of religion has been neglected. Ugly, eccentric, picturesque, beautiful churches have been built, the beautiful expressing no more religious sentiment than the ugly. Were it possible to wheel all our churches into line, a most pitiable tale of irreligion they would show, a sad commentary they would make upon the estimation in which religion and its art were held by their builders!

Pain, distortion, folly, caprice, foolishness, thoughtlessness, stupidity, neglect, a disregard of proprieties, a wanton carelessness of ends, self-consciousness, worldly pride, a puffing-up of individual work, an orgy of form, a mania for variety, a collection of separate entities, a perpetual doing of things that ought not to have been done, and a steady undoing of things that ought to have been done: these and many other like qualities dominate our church architecture. The minister, rising in his pulpit to denounce in vigorous language and in no uncertain manner, the onslaughts of the devil upon his flock, is seldom aware that Satan has put his mark upon every stone of the building he is speaking in, and has placed his seal upon the much-prized artistic adornments with which it is decked out.

But we need not attribute the extraordinary state of our church architecture to demoniac possession. Of the many human faults and failings it illustrates, none is so marked as ignorance, nor is any one cause the production of more architectural evil. If our churches are bad, if they do not illustrate Christian feeling, if they do not give testimony to Christian ideas, if they fail to manifest a reverential feeling and those lofty and pious thoughts associated with the Christian religion, it is because our architects, our clergy and our people are ignorant of the principles of Christian architecture, and fail to understand its application to modern needs. If our churches express the sins of their builders, they are not less expressive of their ignorance. Christian architecture, its meaning, its intent, its necessity, is the one form of architecture we, as a people, are least familiar with. We build many churches, we call ourselves a religious people, we spend huge sums on religion and in its interests; but with all this our interest in true religious architecture and our appreciation of it are so infinitesimal as to scarce be apparent.

This ignorance of the sacred office of architecture — for to what nobler uses can it be put than the glorifying of God and the setting forth of His honor and might? — is not confined to one set of people nor to one section of our country. It is universal: architects, clergy, laymen do not differ in the profundity of their ignorance or in the depths to which the secularization of religious architecture has been dragged. And this ignorance is not only widely spread, but it is fostered by the ungodly churches that are constantly being built, and which are often praised as successful by those who make it their business to instruct the public in things whereof they know nothing, but need an authoritative guide.

In the following papers an attempt will be made to show wherein Christian art, in its application to the modern church-building, consists. It is not reasonable that our ignorant and degraded condition towards the highest form of architecture should continue, the more especially as the church building is almost the single structure that in our time is capable of idealistic and purely artistic treatment. If it is an inspiring task to praise God in the art of speech, it should be not less inspiring to praise Him in the art of architecture. If we are to bring our choicest gifts to the altar, if we are to give to God the best of our lives, that we may have eternal life and joy everlasting, it is equally incumbent upon us to praise Him with every thought and in every deed; surely, as well in the buildings we set apart for His service, as in the prayers we utter and the hymns we sing. That we have long forgotten to do so does not alter the fact of the Christian and consecrated nature of religious architecture.

A CHURCH LIKE A CHURCH.

A church is a building that, by its purpose, stands apart from all other architectural creations of mankind. This is true not less in

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our own day than in the past, when the church, and even its predecessor, the temple, had a firmer hold on the affections of the people, filled a larger part in daily life, and was, in truth, the first building of every city. To-day we have reached a point at which the church building has ceased to be even an important factor in the city's outline. Huge masses of business buildings now dominate our American cities, where formerly a church spire was the most conspicuous object. The building of a church no longer excites keen public interest, though a local and individual interest may be quite intense. Its place in our life has undergone a change. Yet, notwithstanding all the Church's modifications, its battle with modern unbelief, its conflict with modern indifference, a church building of to-day is still the expression of the most sacred possession of the human race. The changes the Church itself has undergone in ritual, in belief, in doctrine, in form, in method, are small and insignificant when placed beside the great fact that the church building is the House of God.

Whatever one's belief may be, whatever one's faith or thought, that, at least, is a fundamental fact from which there is no escape, and on which, moreover, there is no room for difference of opinion. For the believer, there is no need of argument; and even the sceptic must admit that, from the church-builder's standpoint, his church building is what he asserts it to be, the house of God. It was a recognition of this mighty fact that, in the Middle Ages, impelled the building of the great cathedrals. But church architecture in America has removed so far from the standpoint of the mediæval builder, which is the standpoint of the earlier Christian builders enlarged and glorified, that to talk of a return to the principles illustrated in such buildings seems both foolish and unnecessary. It is a most mistaken notion to imagine that in arguing for a return to the *spirit* manifested in the church-buildings of the Middle Ages a return to mediævalism is advocated. Not at all: I do not argue for mediævalism in our modern life, but I do ask that some little thought be given to the present state of our church architecture. Its position certainly cannot be better shown than in contrast with the greatest church-building era of the past. We may not approve of that time, we may not be willing to tolerate the beliefs its buildings illustrate, but of the purity of their architecture, of the nobleness of their intent, and of their manifestly sacred character there can be no question.

Can this be said of the churches of our own time and land? If our churches are the houses of God, and if they have ever been such, how can we compare the honor done Him in the nineteenth century with that of the thirteenth? Have we proved worthy of our trust? Do our churches reflect our faith and our confidence in God? Can we, to be plain, inscribe in very truth the words "To the glory of God" upon every temple we have built?

I know of but one answer to these questions, and that is the same to them all. No. The idea of an architecture that shall be truly religious, that shall speak of God's truth and man's faith in God, is scarce known by name in this land of ours that so prides itself on its Christianity. An architecture for religious uses is different from a religious architecture, for religion only enters into it in so far as making use of buildings supplied for its needs. A religious architecture is religious not in name alone, but in purpose, in intent, in quality, in expression. It is endowed with the pure and holy spirit of religion. It redounds to the honor of God. It sets forth the inestimable benefits God has conferred upon man. It speaks of reverence, of faith, of love, of charity, of humility, of peace and of eternal rest. It is not the art of the skilful arrangement of masses and materials, of voids and solids. It is not composition nor proportion. It is not archæological research nor profound wisdom in statics. It is Christian.

This one word sums up the whole of church architecture, modern and mediæval, old and new. It is the single quality that is needed in the modern church, just as it is the single quality that is most conspicuously illustrated in the churches of mediæval Europe and in the early Christian buildings of Italy. It is a refined and subtile quality whose presence in the older buildings is more readily recognizable than defined. Not only does it speak for itself of the consecrated nature of the churches, but it places an indelible mark of distinctness upon them, separating them off from other buildings, and marking a church as a church and nothing else. This would seem to be at no time of more importance than in our own, when we use all sorts of architectural forms for all sorts of purposes, and confuse lay and sacred buildings with scandalous recklessness, it is, therefore, at the outset, a matter of the first importance that our churches should look like churches, and that a primary condition of their design shall be that they may stand apart in quality from other buildings.

The history of Christian architecture shows the development of four leading ideas that have been utilized to obtain this result. These are: (1) The distinguishing of the church building by form; (2) Its distinction by size; (3) Its distinction by ornament; and (4) Its distinction by quality. These four elements may be briefly considered.

The Church Building distinguished by Form. — This is, perhaps, the simplest, easiest and earliest way in which the church building was differentiated from other structures. It is a distinction obtained through the plan and elevation. These have varied in all styles of architecture, as every student is aware. But we are not concerned with the evolution of architecture or its history, but with a study of the principles that lie behind its growth. Whatever the plan of the church, however much it may have varied with progress in construction, or have been influenced by ritual or ceremonial requirements, there runs the common fact through all of this change and variety — and the history of architecture shows it to have been not small — that it differs from the plan of other buildings. Churches have, indeed, in debased periods, been put to all sorts of uses, but never in their original form. The church plan has always been distinct from the plans of contemporary buildings, whatever may be its relationship to previous or succeeding plans. And with the plan, so with the elevation.

In the historic periods of architecture a church always differed in structure and in form from other buildings, as it differed from them in plan. A church always looked like a church, and by this, perhaps more than by its distinctive plan, it was recognized by the people, by believers and by unbelievers. The forms used in other buildings — the openings, the columns, the doors, the detail — were often the same as those used in the church, but the combination, the completed structure, the finished edifice, was like unto nothing else. Even in the decadent period, when the grossest forms were used, when ornament and decoration were vulgarized and ugly, when all sense of religious proportion and perception seemed lost, this still remained as an identifying characteristic of the church. In our own day it is scarcely less true; for the modern auditories and lecture-halls, in which the traditionary form of the church building is wholly lost, still retain the outward characteristics of a church building that differs from all other buildings. Distinction by form, by elevation, by design, by plan, is one of the simplest and most direct ways in which the church building has retained its identity of structure.

The Church Building distinguished by Size. — Of the early and obvious applications of this element to architecture there is little to be said that has not, time and again, already been said about it. Size is the most easily comprehended of architectural properties. A mighty building pertains naturally to a mighty subject. The wandering savage who worshipped a huge block of stone or a mountain; the pagan monarch who built a gigantic tomb for himself; Justinian when he built the vast church of Sta. Sophia; the builders of the mediæval cathedrals; were all alike in expressing this feeling for size. It was right that the monuments of the kingly power should tower above the lesser buildings of the pagan city; it was right that the temple of the Most High should arise above the surrounding structures of the mediæval city; right and natural that the glory of God, the faith of His servants, the love and fidelity of His followers should be thus exalted above all other objects, that it should stand out as a beacon beyond all other structures, that the Cross of Christ should be supreme among the monuments built by men.

Size, in itself, is the least important of architectural characteristics. A thing that is big is easily built, if one has the materials and means with which to build it. But a survey of the history of Christian architecture shows that the Christian builders did not employ size in a wanton fashion of human boastfulness and pride. When they built a castle and a palace it was rather laterally that they expanded it, than vertically. When they built a church it was upwards their thoughts were directed, and it was upwards their structures were expanded. Size, with them, meant more than mere bigness, expansion, bulk. It was part of their system of religious building, part of their faith, part of their love for God. And so, while all churches are not big, while size in itself is not an essential property of the church building — save that the larger the church the greater the number of the faithful that may be accommodated within it — it is one of the elements most frequently employed by Christian builders to secure the individualizing of their church-buildings.

And how they used it! The world knows only two groups of buildings in which the element of size is used in a supreme manner: the Egyptian temple and the mediæval cathedral. Truly speaking, there is but one, and that the cathedral, for the Egyptian temple was a succession of courts and buildings, of galleries and of ornamental adjuncts; all but a monumental city in itself; while the cathedral is a single structure, standing alone and complete, even when its cloister, its episcopal palace, its chapter-houses, its subsidiary buildings are removed and taken away. The unrivalled splendors of a Gothic vault, the myriad soaring columns, the vast and splendid windows, the endless perspectives, the overpowering immensity of the height and size; surely that is the noblest and most Christian use of size in building — that the most overpowering, yes, the most awesome way of obtaining an effect of sublimity! Walk through the naves and aisles of Amiens, of Notre Dame at Paris, of Rheims, of Laon, of Chartres, of Le Mans, of Bourges, of Cologne, of Westminster, of Canterbury, of Lincoln, of Durham, of York: there is size in its most Christian form; there is grandeur put to its most sublime uses; there is reverence in its most exalted manner; there is joy in divine love and pure delight in human ability to glorify God in human labor!

Size in its religious use did not expire with the mediæval cathedral. The builders of the Renaissance were quick to recognize its value as an expression of religious hope and faith and love, albeit they used it otherwise than it had been used before. Brunelleschi and Michel Angelo were animated by a common thought when they reared their mighty domes, Sir Christopher Wren followed them closely in giving expression to the same feeling. A mediævalist may not always find satisfaction in the churches of the Renaissance period, but the unbiassed student must see the same expression

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through magnitude that is seen in the mediæval churches. The forms are different, even the plan is changed, but the vast churches of the Renaissance give expression to the same value of size as an element in religious architecture as do the mediæval cathedrals. The spirit is the same, though the difference in the forms and the structure oftentimes hides and covers it.

Our own time has given many testimonies to the same feeling, which surely we must count one of the oldest and most firmly rooted ideas in the human mind. A vast church to-day is looked upon with much the same feeling — as a votive offering — as a vast church in any preceding time. But huge churches are no longer built as frequently as formerly. Only on rare occasions is a church of really great magnitude now undertaken. Size enters into the structure of our modern churches to a relatively slight extent. And more than that; a new spirit has come upon the building genius of the age, and the loftiest structures of our modern cities are no longer the churches and the church towers, no longer the houses of God, but vast structures given up to business, rearing their huge and ugly bulks until the once aspiring church tower is hidden in the depths. This does not imply, as some may think, that an epoch of money-getting has settled down upon us to the peril of our souls and the undoing of our faith; it is a change in methods of building, a change in the ordering of our daily affairs, a change in economics. A change in faith, in love for God, in hope for the future it need not be, nor is there ground for so thinking.

I have dwelt at some little length on the element of size in church-building to develop this last point — that it has almost disappeared as a distinctive element in modern church design. The few instances in which it has recently appeared, such buildings as the votive church of Montmarte, at Paris, or the Protestant Episcopal Cathedral, in New York, are entirely exceptional. The modern tendency is towards small churches. Doubtless the exigencies of Protestant worship, the putting of the sermon in an important place in the divine service, the necessity of having a building not too large for a single human voice to be heard distinctly in it, and the doing away with chapel services, still common in the Continental cathedrals, have all helped to bring about this result. But whatever the reason, it is, at least, well to note that it is no longer necessary to build big in order to obtain a truly churchly effect. If the house of God is less imposing than it was, if it has lost its vast and overpowering bulk, its splendor of size and its magnificence of dimensions, it has multiplied and increased in lesser ways, extended its work in less pretentious buildings, carried the story of the gospel in a less lordly manner, but in a way entirely in keeping with the needs of modern life and its customs. Churches have diminished in size but increased in number. Less splendid in form, they may be more useful in the end.

The Church Building distinguished by Ornament. — Leaving the special question of the suitability and adaptability of the decoration of the Christian church to a later time, it may be well to note, in the present connection, that it is one of the most direct and simple ways of distinguishing the church from other buildings. In the Middle Ages they did, it is true, place images of the Blessed Virgin and of the saints upon their houses, but such decorations never concealed the structurally unchurchly nature of the buildings. On the contrary, the church building was distinguished from other structures not only by the quality of its decoration, by its religious significance, its sacred meaning, but it was the most richly decorated structure of the city. Men showed their love for God in the beautifying of His house. The beauty of its decoration, the sumptuousness of its apparel, as it may be called, was as important, as exalted, as essential as the building on an individualized plan or on a scale of great magnificence. No church was ever deemed completed until it had been decked out with sculpture, until its windows had been filled with glass of gorgeous hues, until its walls and sometimes its carving had been colored. We do not think so much of this now as it was once thought of. At a later time I shall have somewhat to say on this aspect of Christian architecture and its relations with the church building of our own day.

The Church Building distinguished by the Quality of its Art. — Form, size, ornament are all-important and essential elements in giving the church building distinctive character, but over and above these, more important than any of them, singly or together, giving the church its true character, entering into its structure in every part, is the religious quality of its art. A church must look like a church, must be possessed of churchly quality, it must speak for what it is, it must tell every one, the believer and the unbeliever, the pagan and the infidel, that it is something differing in every way from all other structures. For the house of God can be like no other house; it can have no quality in common with other structures; consecrated to sacred ends, put to sacred uses, intended for sacred purposes, it must speak of these things with no uncertain voice. The awe that fills one in a mighty cathedral, the wonder and amazement that stirs the soul, as one walks beneath its lofty vaults and amid its ponderous columns, is not occasioned by long aisles and ample arches, does not come from rich carving or brilliant glass, is not dependent on lofty vaults and distant perspectives, but arises from the deep religious feeling and the holiness of mind with which it is permeated; the exaltedness of purpose, the confidence in eternity, the hope, the faith, the love, the veneration.

This is the essence of religious architecture; this the basis on which it rests. We may reproduce the plan of the most churchly church in Christendom, we may build it higher than ever a human building was reared before, we may cover it with ornament and decoration, people its walls and columns with images of all the saints, fill its windows with the costliest of colored glass, reproducing sacred legends and pointing holy lessons, yet if this is not done in a religious spirit, if it is not filled with a holiness of feeling, with a love for God, with an appreciation of the sacredness of the place, its purpose, its end, then the structure will fail in the first and greatest essential of religious art.

Need it be argued that the church building — even though we dispense with images and with glass, with carving and with decoration — the structure must be, first, last and all the time, religious? Is it not agreed that the church is the house of God, be the worship that is carried on within it, the creed that is preached within it, the forms and ceremonies that are practised within it what they may? To those who use it, it must be so, whatever their beliefs, whatever their ceremony. The builders of a church must start from this elemental proposition. And so no argument is needed; for being the house of God, it must have a quality that shows this. This, then, is the base on which church design rests. It is the starting-point that must be kept in mind when the church-building is criticised. It is the standard by which the success of the church is to be measured. It is easy to remember, and indisputable, for a church must always look like a church. Barr Ferree.

[To be continued.]

SMALL CHURCHES IN THE ISLE OF WIGHT.

BRADING.



St. Boniface, Bonchurch.

THERE are a number of small churches in the little towns along the south coast, and several in the interior, of the Isle of Wight, which offer to the casual tourist, to artists, and especially to students of architecture very many points of interest. They are wonderfully picturesque in their settings of island landscape, seated usually in the midst of old graveyards full of mossy aged tombs. They are rambling irregular buildings, the outcome of many periods and styles, the accretions of generations of priestly builders.

The island abounds in good building-stone, much of it, indeed, having been carried away and used in churches along the mainland. The walls of nearly all the churches of the south side of the Wight are of a local sandstone, of greenish color and very soft, easily worked when first from the quarry, but becoming very hard on exposure.

Many of these churches have suffered from lack of means to repair them in times past, in fact in one or two which I visited there is at present very urgent need of a considerable outlay to make good the ravages of the weather, but in the main they strike one as being particularly well kept up. Happening upon one or two of them casually in looking up subjects for sketching I became so interested that I finally made a pilgrimage afoot from end to end of the Wight, in the course of which I collected the data and made the drawings given in this paper.

I subsequently found in Southampton a very handsome book on the subject, "*The Antiquities of the Isle of Wight*," by Mr. Percy Stone, F. R. S. A., in three volumes, 1893, from which I was enabled to obtain through the courtesy of a friend some of the historical and archæological points which I have briefly noted about the churches. I had unfortunately a very limited time at my command, and had only a hasty glance through the volumes, but they are full of interesting matter and valuable illustration, the work being gotten out in a style of paper and printing which makes it worthy a place in the library of the antiquarian or architect.

Although St. Mary's Church at Brading is not the oldest in the island, it occupies ground which is said to be the first used for Christian worship in "the Wyght."

As one approaches Brading from the station the church is seen upon a green hill across the meadows, a long broken gray mass with a square tower surmounted by a stone spire at the western end, standing amid a field of old graves.

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There is a pleasant short cut making off here across the meadows to the church, but it is a pity not to walk up through the long straggling village, past the "Wheatsheaf" and the "Sun" and other quaint old houses which line the way. The church is at the upper end of the street and the tower stands close to the road. The square portion is not very high, but the broached spire above gives the tower quite an appearance of height.

In the base are four bold arches, with gates, leaving the tower standing on four massive piers. This part of the tower at least dates from the thirteenth century, and the spire is probably of the same period. The latter has a very perceptible entasis.

The church itself, of which the oldest portion is the nave, is of the end of the twelfth century. The arches are very pointed. The aisles were added in the thirteenth century, but the only discoverable remains of the aisles of this period are in a lancet window in the end of the north aisle.

I remember a very happy morning when I sat for many hours under the pleasant shade of a tree in the churchyard making a water-color sketch of the church from the northeast. There are delightful tones in the walls and roof on this side. It was a Saturday and the verger and her children were very busy making things tidy for the morning, and they were constantly coming out of the little north chancel door to beat red pew-cushions and add vigorous touches of life and character to the picture. This was called the priest's door. In the stone above it on the inside there is incised in deep lines a double cross, "engrailed." The chapel into which the priest's door opens was reconstructed at the end of the fifteenth century, when the south porch was added and the aisles were enlarged. As in most small English churches, the south porch is now used as the principal entrance. The south chapel, the mortuary of the Oglander family, was built by John Oglander, who died in 1530, and sleeps in the tomb in the southwest corner of the chapel. A later Sir John lies under the polychrome wooden effigy of a knight in armor lying at length, slightly raised upon the elbow, his crossed feet resting on his dog [lion]. In the niche above is a small copy of this carving, a memorial of George, son of Sir William, of the same family. An interesting tomb has in the panels, on the chapel side, reliefs of Sir Oliver Oglander with his wife and children: Sir Oliver, in full armor, except his casque, kneels with folded hands, facing the east; in the next panel is his heir, in a sort of kilt dress, such as is now worn by little boys, and behind him a couple of smaller boys; Lady Oglander, robed in a sober nun-like mantle, fills the next panel, followed by a group of their little girls in the fourth. On the back, next the chancel, are carved some crippled beggars, a monument to the charitable deeds of the good Sir Oliver and his lady. A weekly offering of loaves for the poor was for a long time placed upon this tomb of their ancestor by the bounty of his descendants.

The tombs of the Hawley, or de Auld, family are also noteworthy, and in another part of this church is a very interesting floor-slab of Purbeck marble, much worn, bearing an incised figure of an armored knight, at full length, resting each mailed foot on the back of a couchant dog [lion]. He has long spurs, and a great sword lies by his side. The hands, quite lost, were evidently folded on his breast, and he wore his helmet. In the border are traced a succession of canopied niches inclosing various saints.

The plan of the church may be readily understood from the above description. Its characteristic feature, from the east, are the triple gables of the chancel and the chapels north and south of it, the latter being simply eastward extensions of the aisle, independently roofed.

The rusty iron arm in the parapet of the square tower held a flaming beacon in the olden time, kept alight on stormy nights to guide the ships at sea in the Channel. The church towers all along the island shore were known landmarks by day, and showed their beacon-lights across the darkness to the coasting sailors when the night and storm gave need. Aloft on the finial, the brazen cock of Peter turns him to the wind. From the belfry comes the music of eight good bells, four of which wear upon their collars the dates, 1594, 1604, 1622 and 1709. Behind the chancel end, there is a perfect wilderness of tombstones, some of whose shapes are quite full of art. Time has painted them in a glorious decoration of moss and lichen and ruin.

SHANKLIN.

The Church of St. John Baptist, the old rectory church of Shanklin, has very little about its present aspect to indicate so great an antiquity as is suggested by its having been enumerated in the Roll of Arms of Edward III, in which it appears as a parish furnishing one bowman to swell the ranks of the men-at-arms of "the Wyght." All of the structure which has come down to us from that remote day is comprised in a bit of the south wall, where you will observe a small one-light fourteenth-century window, and the old piscina in the chancel. The original church thus existed prior to the year 1336.

In the Domesday Book, the manor is mentioned as held by Gozelin, son of Azor, under the Normanized name of "Seneliz." It became a Royal manor in the time of the Confessor.

William of Wykeham included it in the register of churches, 1367 to 1404, as the Chapel of St. Blaise.

Early in the sixteenth century it belonged to the rectory of Bonchurch. The transepts and the lengthened western end are modern work. The treasure of the vestry is an old oaken chest carved with the date 1512, and the name of Thomas Silkstead, the last prior of Winchester.

Mr. Stone speaks of its ornamentation as a good example of decorative work, showing the infusion of Classic feeling into the late Gothic motives. But, aside from its archæology, the old church is interesting for its picturesque beauty. It stands among some old trees at the head of the main road, coming up out of the town by the old Crab Inn and the mossy thatch and Elizabeth chimneys of the Pencil cottages. Beyond the graveyard wall is a wide open field sweeping away upward into the slope of Shanklin Down, which rises behind it to a height of eight hundred feet above the Channel water.

The weather-beaten walls are clothed in glorious masses of ivy, and the red tiles of the roof are stained and moss-grown. There is a fine black yew-tree at the western end. There are no very interesting tombs or gravestones.

Among the several handsome new churches in Shanklin, Saint Savior, on the cliff, is particularly noticeable in respect of a well-designed stone spire.

BONCHURCH.

There is a most delightful walk from Shanklin down over the cliffs to Bonchurch. A narrow path follows the edge of the cliff, which rises in sheer monumental grandeur from the broad flat beach. Seaward, the blue Channel runs to the horizon. The passing ships, of which from that part of the island shore there are usually from twenty to thirty sail of all classes in sight, form a picture of never-failing interest. Landward, the furzy side of the Down slopes upward.

At Luccombe, a wild "chine," or gorge, cuts well into the shore. By a small path and steps cut in the sand and chalk on one side, one may descend the little cañon, in which nature has done some wonderful bits of ferny detail, and from the stones and seaweed of the beach get some impressive views of the castellated cliffs from below.

Beyond Luccombe the path crosses the "Landslip," winding in and out and up and down among the wildly tumbled boulders, the little hollows and hillocks, and all the strange broken landscapes of that wonderful place, which with its strange gnarled trees, its fern forests, its great mossy rocks, its sudden changes of form, seems designed by Nature as a little fairy world of delightfully varied miniature landscapes.

The shore descends toward Bonchurch. The old church of St. Boniface is beside the road leading inward from the shore. It is a long, low, narrow building, very worn and old in look, glorified by a wealth of trailing vines which tenderly clothe its ancient walls and cluster upon the very roof-ridge. The building is old in story, having been, according to an old manuscript of Sir John Oglander's, "erected in ye reygne of William ye Conqueror by one Joannes de Argentine, a ffrenchman," probably of Argenton in Normandy. An older legend has it that an earlier church, built in the eighth century, stood upon the same ground.

The form of the building will be sufficiently indicated in the hasty sketch I have been able to give of it. It is very narrow, probably not over twelve feet wide inside. The chancel is cut off by an arch of severe plainness. This was the plan generally used for private chapels belonging to the great manors, built by the lords, but under the control usually of some neighboring house of monks, and used by the people generally as places of worship.

The Conqueror brought over a lot of his Norman monks with him, and they spied out and siezed upon all the fat places of the land without loss of time.

The most successful of these were the monks of the Abbey of Lire, in Normandy, who held all the best church property in the Isle of Wight, until they were dispossessed in Henry V's suppression of the alien monasteries.

The stone used in the building of the Wight churches was quarried in the island, where there are large deposits of the hard, shelly limestone used in Winchester Cathedral and the "green-sand" freestone, of which I have already spoken.

Bonchurch has a modern south porch, within which the door into the church belongs to the early building. The door itself, hanging in a low pointed arch, is a heavy one, of oak planks rudely put together in a double thickness, the planks horizontal within and vertically fastened together with heavy stud nails, the heads of which, broad, square and hammered to a cone, are made ornamental by impressed lines or cuts, radial from the point of the head — a simple but effective decoration which was not done without some little trouble of the patient smith, but which gives life and interest to the plain old door. The bell-cot is by no means a thing of beauty and is incongruous enough to have been done, as it doubtless was, in the Georgian period.

The windows cover a range of time from the twelfth century, the narrow single lancets, to the fifteenth.

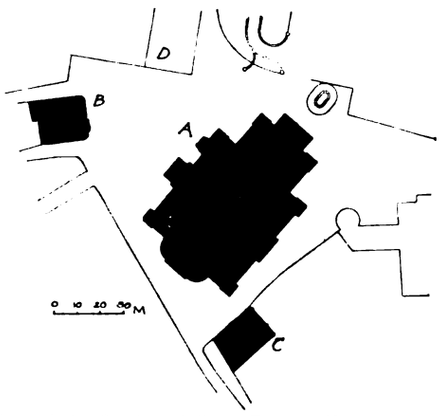
A. B. Bibb.

Historical Exhibitions to be held at Vienna. — Vienna is to have a unique exhibition from January to May, 1896, in commemoration of the Congress of 1814, comprising portraits, autographs, personal mementoes and illustrations of scenes connected with that memorable event, together with china, glass, tapestry, embroidery, linen and other clothes, etc., illustrative of the early years of the century. Aside from the interesting historical collections that will thus be brought together, it would take a diplomat to tell why there should be any special commemoration of the Congress of Vienna. — *The Interior.*

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THEATRES.[1] — XXI.

THE GRAND-DUCAL STATE THEATRE, MECKLENBURG-SCHWERIN.



Plan of the Grand-ducal State Theatre, Mecklenburg-Schwerin. *A.* Theatre. *B.* Workshop. *C.* Machinery-house. *D.* Museum.

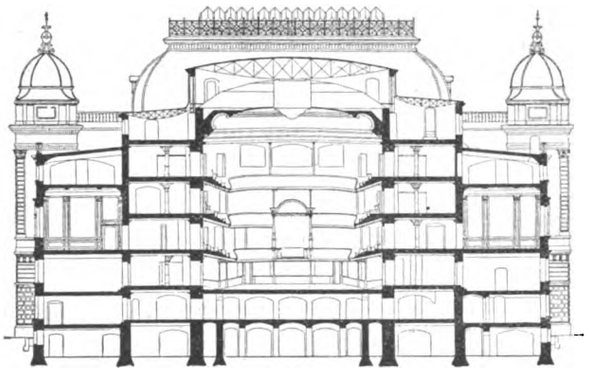
ON April 16, 1882, the Grand-ducal State Theatre of Mecklenburg-Schwerin was destroyed by fire during a performance of "*Robert and Bertram*." This catastrophe was fortunately not attended with any loss of life.

Immediately after the loss of the building the authorities decided to rebuild the theatre without any delay. At first it was intended to re-use the external walls of the old building, but it was eventually found that the effect of the fire had rendered them too weak for the purpose.

The block plan of the site which accompanies this article shows the relative positions of the theatre and the museum. The proximity of the museum to the theatre was looked upon as a probable source of danger to the former, and it was, therefore, resolved that the play-house should be reconstructed upon fireproof principles, and not too near the museum, as another conflagration might imperil its contents, so the new building was erected upon the site shown in the accompanying plan. The theatre really consists of three distinct and separate structures: the play-house proper, the store-house for scenery and property and the machinery-house, all divided from one another by open spaces. The architect of the theatre was Herr Daniel, present Government Surveyor of Public Buildings, who was assisted in the preparation of the plans and details by Herr Raspe, and in the supervision and direction of the works by Herr Hamann. The erection of the building was begun in the year 1883.

As in all great projects, difficulties arose from the very outset which had to be overcome — on beginning to dig for the foundations a bad bottom was found to exist; special care had, therefore, to be taken, and the construction of the building had to be carried out with the greatest precaution both as to stability and safety from fire. The general construction of the building has, therefore, been executed with solid walls and ceilings arched with fireproof floors above, a roof of iron construction, and side roofs in the form of asphalt flats.

The peculiar feature of the building is that the space over the grand vestibule, usually devoted to the foyer and grand staircases, is designed for a concert-hall, extending to a height equal to two stories of the theatre and in length the whole front of the building. The area-level of the concert-hall is accessible from the first flight of

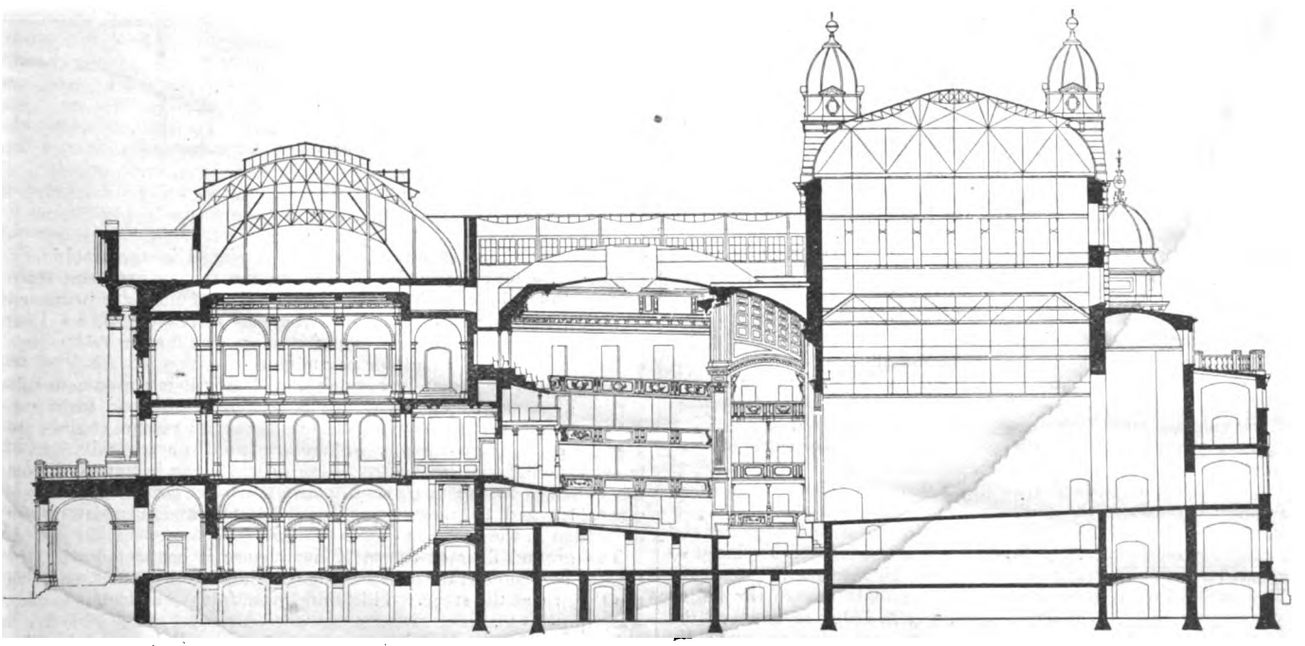


the staircases which lead into the theatre, while the gallery of the concert-hall is also approached from the third flight of the theatre staircases.

The state, or court, box, is placed in the centre of the auditorium on the first tier; behind this box and between the theatre and the concert-room is the Royal saloon which can be used by Royalty both for the concert-room and the theatre. This saloon has a separate entrance from the street and is approached by a staircase placed on the right of the building.

In addition to the state-box here described there is on the right of the auditorium the grand-ducal stage-box, generally used by high personages. The approach to this box is arranged in the centre of this side façade with an enclosed carriageway. A special staircase serves for this entrance. On the ground floor large doors open from the vestibule into a corridor behind the auditorium, the central door leads to the parquet or stalls on the first floor, and the two side doorways lead to the staircases on the right and left of the theatre which serve as the approach to the second and third tiers of seats. These staircases have special exit-doors of their own leading directly into the street without re-entering the vestibule, so that people can depart from the tiers above without mixing with any of the audience leaving through the vestibule.

The staircases are planned with more steps in a flight, without intercepting landings, than are accepted by authorities as wise for the safe construction of staircases, where large crowds have to descend rapidly: in many cases there are as many as nineteen steps



The grand vestibule is approached from the main entrance, which, together with the grand buffet serves as a general foyer, and affords an entrance for the public to all parts of the house.

The front façade is carried out in granite, sandstone and Schwerin cement, Italian Renaissance being the style adopted.

In front of the main entrance is an arched, covered carriage approach, connected with the vestibule by three pairs of double doors. On the left side of the vestibule is the box-office and porter's office.

[1] Continued from No. 1030, page 120.

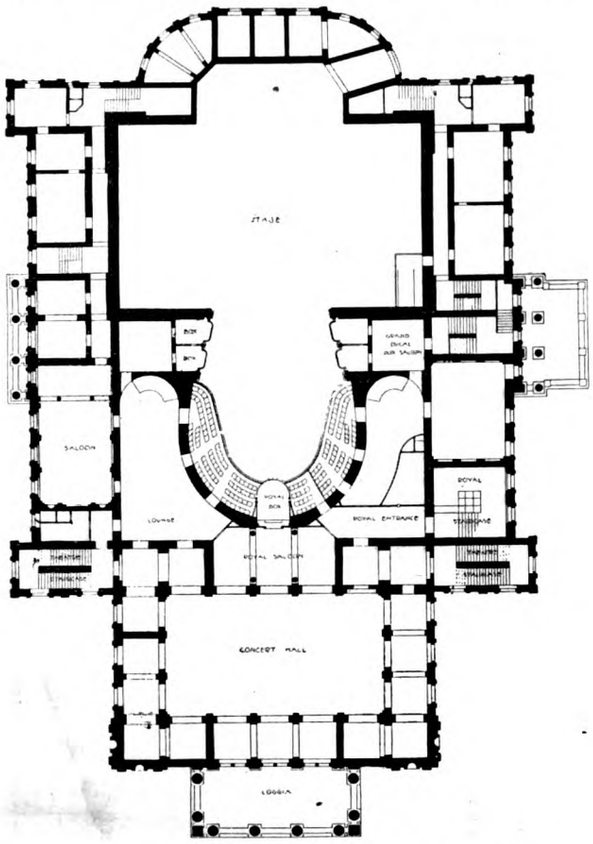
without a break. The circular staircases near the proscenium are also of a form which would seldom, if ever, be found in a theatre of the present day. The method of bringing all the people in at one entrance and trusting to chance for their ready escape by "*extra exits*" is unsatisfactory, as fully explained in a former number when M. Baes's reasons for planning the Theatre Flamand upon these lines were recited, although in this case the exit-door is placed at the foot of the staircase and would be easily found. Yet the "*way out*" is not the same as the "way in," nor is there any special reason for the audience becoming acquainted with the way out unless directed

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thereto. It is, however, difficult in designing opera-houses where most of the people arrive in carriages at the front entrance to devise separate entrances for the various-priced seats at the higher levels, and the number this theatre will hold is very small.

We understand that the concert-hall is never used at the same time as the theatre, as the entrances and exits are common to both and a crowd coming with a rush from both would cause fearful panic. The holding capacity of the theatre is comparatively small considering the amount of ground covered, as it is designed to seat only one thousand spectators.

The corridors behind the auditorium at each level are spacious, and with them are connected the cloak-rooms and lavatories, but these do not always appear to be judiciously located, as in many places on the plan the water-closets are shown not to be next to an external wall, an arrangement never satisfactory under any circumstance, as they are sure to be ill-ventilated, badly-lighted, stuffy and unhealthy, besides enforcing much unnecessary soil-piping within the building and adding thereby chances of escape of sewer-gas from bad or defective joints. There are on the first floor, on either side of the theatre, smaller foyers in addition to the concert-hall over the vestibule. The chief usages of this concert-hall I must



not omit to say are for state and other functions as well as for concerts. It can be much enlarged by the removal of the partitions enclosing the state-box.

In case of an outbreak of fire, it is claimed that there are five staircases available for the use of the "parquet," two leading directly into the open air — which two I would point out can be also used by the whole of the audience seated in the balconies and galleries — and three into the vestibule.

Much valuable space, which might have been devoted to providing separate staircases for each division of the audience, seems to have been employed in constructing special "*grand*" staircases for Royal and official personages, but then it must not be forgotten how small the seating-capacity of the auditorium is.

In the description of the building supplied me with the loan of the drawings for this paper, it is stated that the orchestra is placed so low that the musicians cannot be seen from the parquet.

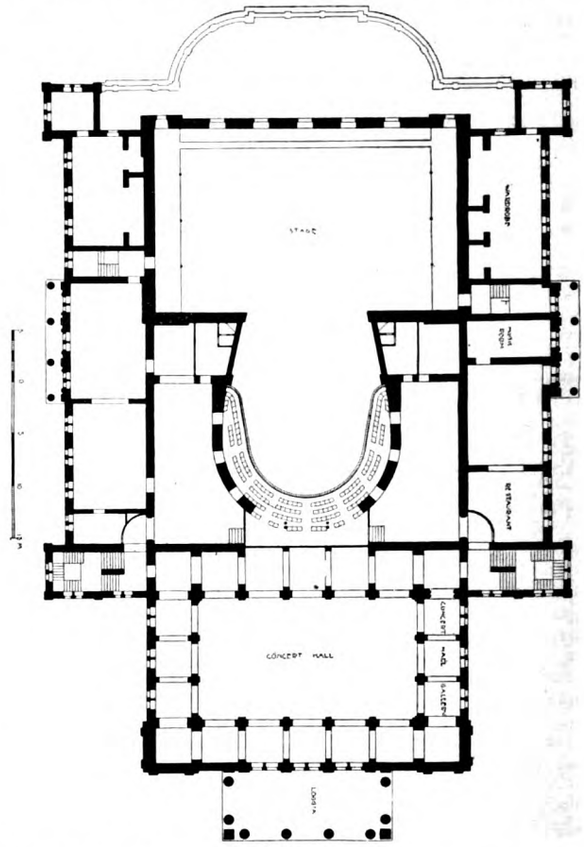
The auditorium, it is said, was made small to ensure the better hearing and seeing from all the seats, and in order to improve the view the tiers, including the private stage-boxes, decline gradually towards the stage.

The basement is, with the exception of the part under the stage, used for the ventilating and heating chambers and various workshops and lavatories. The heating of the theatre is very necessary on account of the severe winters experienced. In the stage portion of the building are situated the dressing-rooms for both soloists and chorus, the property-rooms, hair-dressers' saloon, furniture stores, florist's room, manager's dwelling-rooms and offices. There are also large chorus rehearsal-rooms as well as practice-rooms for the ballet, and armory and wardrobe rooms for the theatre. All these can be studied in greater details from the drawings.

The stage is a large one, being 92 feet in width with a depth of 56 feet which can be increased to 72 feet 6 inches by including the back stage. The machinery below the stage is constructed of wood, the reasons given for which are economy and that it may be more easily handled. The upper machinery is of iron. The stage is lighted by day from windows placed high up, so that no artificial light is needed during the day-rehearsals, thus reducing the fire-risk and the expense of artificial light. By night the electric light is employed. An iron curtain is provided to divide the stage from the auditorium and it can be worked from either side of the stage. The curtain is supplied with a small automatically-closing door, so that one can pass through it to the front of the stage without raising the curtain.

The whole of the building, including the concert-hall and the auditorium, is heated on Käuffer's combined system of hot-air and hot-water. The hot rooms of this system lie above the auditorium, the heated air is forced into the ceilings of the side galleries through lattice openings, and extracted through a shaft in the middle of the auditorium ceiling.

The theatre receives its water-supply from the town aqueduct, but in a case of necessity it can be provided with water from the



neighboring lake by means of the pumps placed in the machinery-house. The four reservoirs situated in the towers over the stage contain 40 [*sic*] litres of water: altogether the building is protected with 60 hydrants, and 100 minor hydrants are available. The system by which the theatre is protected from fire would allow 6,500 litres to be poured onto the building per minute.

It is lighted by gas and electricity, oil lamps being used as a subsidiary illuminant. The electricity is produced in the adjacent machinery-house by steam-engines and five dynamos; reserve engines are kept for cases of emergency. There are two distinct installations of the electric light in the theatre, either of which can be supplied from the dynamos in the machinery-house; there are two compound engines, 125 and 187 horse-power, and 2,400 incandescent-lamps can be lighted in the building.

The ground floor of the machinery house is connected with the theatre by a subterranean passage passing under the street, entering the theatre at the stage. This subway contains the electric cables, water-pipes, etc.

The storehouse for the scenery serves the purpose of keeping away from the theatre much of the combustible contents usually stored within the building, reducing the danger from fire thereby.

This building is not strictly a *fireproof* one, as it was considered useless constructing the tiers of iron on the supposition that with such quantities of inflammable material stored therein, even the best ironwork would not afford sufficient resistance to a raging fire.

The cost of the whole of the theatre with the machinery and scenery buildings as well as the fittings of the interior, but without scenery, wardrobes, etc., reached the sum of 2,500,000 marks.

E. A. E. Woodrow.

(To be continued.)

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THE OAK SUPPLY.

IT is commonly supposed that there is almost any amount of oak timber in this country. Though it is seen that the demand for oak lumber is steadily increasing, especially in the interior-finish line, and for several forms of cabinet work, it is thought that there is enough for any consumptive requirement for many years to come.

That there is a good deal of oak left in this country is beyond question. The vigorous opening-up of southern resources has enlarged the horizon of supply, but it is probable that there is prevalent an exaggerated estimate of the grand total, and too much confidence in the prolongation of the supply. It is as necessary to look backward in arriving at just conclusions as to look forward into new fields. We should not overlook the fact that the magnificent oak forests north of the Ohio River, in the central part of the northern oak States, have largely disappeared. The oak of Ohio, Indiana and lower Michigan had been nearly exhausted before the country had reached its present development in population and the industries which are yearly consuming increased quantities of oak lumber. It can plainly be seen that within the past five years there has been a great increase of demand for oak despite the two years of depression which have intervened. This is more especially noticeable in the demand for such product as goes into house finishing, namely, plain and quarter-sawed red oak and quarter-sawed white oak. So large and urgent has been the call for red oak that the supply has been rapidly depleted, and what there is left has fallen into strong hands. Operators can now very nearly indicate the duration of the Wisconsin red-oak supply, and the term limit is not many years in the future. It is probable that within five years the amount of red oak remaining in Wisconsin scarcely will be enough to affect the market in any degree. In the meantime, the remnants of Indiana, Ohio, Michigan and southern Illinois oak will have disappeared, except in small holdings on farms. The great bulk of supply will thereafter be south of the Ohio River.

Southern resources for oak are mainly to be found in the States of West Virginia, Kentucky, Tennessee, Arkansas, Missouri, northern Mississippi and northern Alabama. There is oak in all the southern States, but the alluvial bottom lands of the rivers must furnish the great bulk of lumber to go on the market.

There are no statistics to show how much oak has been cut and marketed from the States north of the Ohio River. But we do know that there was never a better growth or more to the acre than abounded in Indiana, Ohio and southern Michigan. These were the banner oak States. Kentucky and Tennessee have produced a large amount of oak, and are among the partly denuded States. The supply of those States, like that of West Virginia, will be verging toward exhaustion, while that of the States north of the Ohio River is being completely wiped out. Thereafter the main supply must come from the lower Mississippi and its tributaries. The world's demand for quarter-sawed oak is now being largely drawn from that part of the country.

There are some special considerations involved in the oak question. We must understand that the demand is not confined to this country. There is a growing requirement in Europe and in the British Provinces. The entire civilized world is to depend on the American supply, when, as a matter of fact, there is no more here than will be required for domestic consumption. If the finest oak area in the world, that in the States north of the Ohio River, has been denuded, while the growth of the country's population and its industries was in its incipient stage, what will be the effect on the remaining supply, now that the requirement is to be measured by present and future population and industrial development? It is only within recent years that oak has been consumed on a large scale for furniture and interior finish. Simultaneously with the growth and establishment of demand for oak, other important cabinet and finishing woods have shrunken in supply, some having nearly disappeared. We have seen the rise and fall of the walnut vogue. The fall came simply because the supply was so nearly exhausted that it could not longer furnish the material for a large manufacture in the lines of cabinet work and finish. Cherry followed, and introduced the taste for the lighter tints in interior furnishings. Birch is now considerably in request, because it can be finished in the lighter or darker red shades, as an accompaniment of mahogany and cherry. Maple is being employed for like results. But cherry, birch and maple will not last many years. They are now in such limited supply, and so difficult of procurement in adequate quantity for extensive cabinet lines, that they simply afford a diversion from the monotony of oak. The truth is, that oak is the only remaining wood which can be employed in a large way for furniture and hard-finishing purposes. Thus we can see that the demand for oak, though large and growing in recent years, is to be much greater and rapidly increasing from the present time onward. It, hence, follows that the supply in the South will be depleted much more rapidly than was that north of the Ohio River.

The growth of oak production in the South promises to be one of the phenomenal experiences of American lumber history. This prospect should enhance the value of oak lands. Sagacious lumbermen are seeing that which is coming, and many are buying up oak areas. This movement is bound to increase.

There is this to be said in respect to oak-timbered lands: They are invariably areas good for agriculture after the timber is cut off. For this reason denudation will go on with relatively greater rapidity than on lands covered with the softer woods. It was this that cleared the forests north of the Ohio River, and it is the same influence which is rapidly denuding the maple lands of the northern counties of lower Michigan. When the tide of emigration shall set strongly toward the alluvial areas of the lower Mississippi and tributaries, the hard-wood forests will melt away before the onslaughts of the farmers. For this reason those desiring large holdings of southern oak and other hard-woods will need to secure them within a very few years. Having purchased the lands, they will have both the timber and the richest agricultural areas in the country, and thus doubly insure themselves a good prospect of profit. — *Northwestern Lumberman.*

DESTRUCTION OF THE RED-WOOD TREES.

THE war of the syndicate sharks on our red-wood forests is now greater than ever before, in consequence of the gradual exhaustion of the white-pine forests in the Northwest. For some time the Government officials have been securing evidence against these syndicates, but with little success. The timber speculators employ new settlers to locate Government lands, ostensibly for themselves, but really for the employers, who only want the timber. Thus, one of their "dummies" will locate claim after claim and transfer it. By this means, the red-wood timber belt will soon become exhausted, and the lands be owned by the syndicates, to the exclusion of actual settlers.

When white-pine is exhausted in the "Lake States" of the East our red-wood and pine will be in greater demand than even now, but all the lands will be in the hands of a few large corporations, who have used "dummy" settlers to acquire possession from the Government. A peculiarity of the red-wood is that it grows only along the coast line. These forests stretch out for hundreds of miles from Humboldt County on the north to Monterey in the south. Before the arrival of the timber depredators the belt averaged a width of ten miles, but it has been gradually thinned, and appears to have grown in clusters instead of an unbroken forest. These trees are not only remarkable for their size, but exceptional in quality. Humboldt County is the richest of all the coast counties in its denseness of red-wood, pine and oak and timber, having about 1,000,000 acres of forests, of which about one-half is red-wood. The red-wood yields about 100,000 feet of marketable lumber to the acre. It is estimated that 25 per cent of the red-wood forests of this one county have been used by lumbermen — the great majority locating the lands for agricultural purposes, merely to get the lumber. Many others did not even do that. About 200,000,000 of feet of red-wood lumber is taken yearly from this county, and others are denuded in proportion. At this rate, the remainder of the lumber may become exhausted in the next quarter of a century. There is no equal area of land in the world with such dense forests of merchantable timber, and no other country where such wanton destruction and robbery are permitted.

It is not believed that this wholesale depredation by speculative syndicates will be permitted to continue much longer, and some of these "dummy" settlers will be made to suffer. Red-wood is the only lumber that can take the place of white-pine, or be substituted for mahogany and black-walnut. It can displace oak for railroad ties, etc., is better for shingles than cedar or cypress, and can come in contact with the earth, and be exposed to the elements and outlast them all. It may be sunk in water for a foundation, "never gives," and will endure for centuries. Its color is of a reddish tinge, varying from that of the lightest beech to the darkest mahogany. It is difficult to stain it, and it is lighter and more cheerful than mahogany and black-walnut. It makes up well in cabinet work, the variegated grain being a curly mottled "bird's-eye." Its beautiful color makes it most desirable, especially as it takes a fine polish. Many of the finest residences and offices of this city are finished with red-wood in its original "local" color.

Red-wood makes a lasting foundation, solid, impregnable walls, and an almost imperishable roof. As a finishing wood it is unequalled, and for cabinet materials it is superior to most other wood. Eastern breweries use red-wood in the construction of brewing-vats; it is also used for water reservoirs, and shipped to the Eastern States in competition with their white-pine, which is becoming scarcer through vandalism similar to that which is denuding our forests. The red-wood shrinks less than any other timber, and is all the more valuable on that account. The small shrinkage is lengthwise instead of across the grain.

Man seems to be the only enemy of the forest. Insects, so destructive to other woods, hesitate to attack the red-wood, whether alive or dead. The outer covering of the trunk is decayed by time when the tree has fallen; but the saps and acids in the body of the tree seem to battle with time and to preserve the fallen tree for generations. — *J. M. S. in the N. Y. Evening Post.*

RESTORATION. — At Padua, in the historic Church of St. Anthony, important "restorations" are taking place. The chief of these is the reconstruction of the famous altar of Donatello. — *N. Y. Evening Post.*

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SOCIETIES

DETROIT ARCHITECTURAL SKETCH-CLUB.

MONDAY, September 16th, thirty-five draughtsmen met at the Museum of Art and effected a temporary organization of the Detroit Architectural Sketch-club, Emil Lorch being elected *Chairman*, Alex. Plumberg, *Secretary*. A committee consisting of W. E. N. Hunter, R. Mildner and G. H. Ropes was appointed on Constitution and By-laws.

The report of this Committee was adopted at last evening's meeting and the following officers and directors elected: *President*, Emil Lorch; *Vice-President*, G. H. Ropes; *Secretary*, E. A. Schilling; *Treasurer*, R. Mildner; *Directors*, W. E. N. Hunter, F. G. Baxter and Alex. Plumberg.

The object of the Club and its proposed methods of study are like those of similar organizations elsewhere.

E. A. Schilling, *Secretary*.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ALLEGHENY COUNTY COURT-HOUSE AND PRISON, PITTSBURGH, PA. H. H. RICHARDSON, ARCHITECT.

[Gelatine Print issued with International and Imperial Editions only.]

SKETCHES IN AND ABOUT THE BARGELLO, FLORENCE, ITALY, BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP: TWO PLATES.

[Issued with the International and Imperial Editions only.]

ST. MARY'S CHURCH, BRADING, ISLE OF WIGHT. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

For description see article elsewhere in this issue.

HOTEL ST. NICHOLAS, ST. LOUIS, MO. MESSRS. ADLER & SULLIVAN, CHICAGO, ILL., AND C. K. RAMSEY, ST. LOUIS, MO., ASSOCIATED ARCHITECTS.

McDONALD & TAYLOR BUILDING, FORT WAYNE, IND. MESSRS. WING & MAHURIN, ARCHITECTS, FORT WAYNE, IND.

STAIRCASE-HALL IN THE HOUSE OF DR. W. S. BRYANT, NO. 1 CHARLESGATE EAST, BOSTON, MASS. MR. W. Y. PETERS, ARCHITECT, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

THE SMOKING-ROOM: NEW YORK ATHLETIC CLUB, SIXTH AVE. AND 55TH ST., NEW YORK, N. Y. MR. C. W. CLINTON, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print.]

DOORWAY OF THE CHURCH OF THE CONVENT OF S. LEONARDO, APULIA, ITALY.

[Copper-plate Photogravure.]

FUNERARY MONUMENT, ST. RAPHAEL, VAR, FRANCE. M. FELIX NARJOUX, ARCHITECT.

[Copper-plate Photogravure.]

SESSIONS HOUSE, WESTMINSTER, ENG.: TWO VIEWS. MR. F. H. POWNALL, ARCHITECT.

"DAWN" AND "TWILIGHT," AFTER PAINTINGS BY M. CAMILLE BELLANGER.

"CHALGROVE," HARROW-ON-THE-HILL, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

"GROVE HILL," HARROW-ON-THE-HILL, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"A SERIES OF FIREPROOFING TESTS."

BOSTON, MASS., September 13, 1895.

To the Editors of the American Architect:—

Dear Sirs, — In your issue of September 7, 1895, I read with much interest the article headed "A Series of Fireproofing Tests," and thought, much as the writer states in his last statement, that the tests were far more suggestive than complete or convincing. But as the suggestions were not new or conclusive, the advantages of the tests are very indefinite.

It is difficult to understand what conclusions the architect could reach as the result of these insignificant bonfires, and it is our belief his judgment would have been better before than after witnessing so incomplete or misleading a series.

The question of confining heat is distinctly different from that of confining fire, but it is not difficult to answer either case when confined in a practically air-tight compartment; but when we furnish such compartment with a door for the feeding of fuel and air, and a flue for egress of smoke and heat, the test to the surrounding material is slight, as both heat and fire will travel in the current of air produced by the fire, travelling in the most direct course to the flue; and all walls or ceilings, not intercepting this course, are only affected by the heating of the dead air, and air at rest is the most effectual barrier to the progress of fire or heat.

The conclusions of the writer, as expressed in his statement — "the results of these tests have demonstrated the fact that, when proper care is taken to fill all air-spaces and holes in the different stories, especially where the floors join walls and partitions, and where pipes and wires pass through them, a building is practically safe from fire extending beyond the room in which it was ignited, and, in an office-building, apartment-house and buildings of like character, if the fire were to be allowed to burn out the contents of the room without water being thrown upon the fire, less damage would probably result than if water were thrown upon the hot plastered concrete, which might crack and become loosened from the metal lathing, and cause damage in adjoining rooms," — do not seem to be borne out by the facts as shown by the tests, nor at all consistent with practical dangers of fire. As in the first place, we find no method of fireproofing, as yet, which has a connected or continuous air-passage, or one separated by only a barrier of combustible material, that requires any more care at its joining of floors or walls than at any other point, and in a case where such is needed, as in the cases of houses Nos. 6 and 7, we find they did burn through, and with about every condition in their favor; and in the second place, where or when can an instance be found where one had or will have confidence enough in the method of construction to allow all the contents of a room to burn without an effort to extinguish it, when such effort could have been made?

Again, the statement is significant of a lack of confidence in plaster or concrete, as a successful fireproofing, when water is to be used as an extinguisher, which is a fact, and as water will always be used, concrete or plaster never should be.

Again, none of the tests appear to be fair, because the buildings were all erected during cold weather, and frost and dampness were liable to be found in all in sufficiently large quantities to be dangerous, as was shown by the explosions in the plastering of houses Nos. 2, 3 and 5, and no doubt aided in the destruction of plaster in all.

Further, the tests of houses Nos. 6 and 7 could not have been made for the purpose of proving fireproof qualities, as centuries have demonstrated that the materials with which they were built contained no fire-resisting qualities and the only question that could be answered was, how long they could stand the test. This showed, without contact with fire, the material was burning in twenty-five minutes and in forty minutes the whole structure was on fire.

As to the weights of the different materials, it appears some mistake has been made, as while some appear exceptionally light, others are as remarkably heavy. In the case of porous terra-cotta, I have recently witnessed a test of 12-inch arches and 2 inches of cinder concrete, the material showing a weight of only 69.6 pounds per foot, and this with the materials all thoroughly drenched with water and not after a fire.

These tests were unusual and useless as to methods of fireproofing, being simply of heat and not of fire and water — the test to which all are subject when actual fire occurs.

The subject of fireproofing is not one of a single property nor one of many, as fire-resisting qualities, lightness, strength, durability or imperviousness cannot be considered alone, but is a subject embodying them all, and a material or method that does not contain all when in a finished state is not a material for adoption. Cheapness is not a factor in any case unless the systems compared are equally effective when actually tested.

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Tests made are not conclusive unless the qualities proved are tested under the conditions and difficulties met in practice, and if a building, of the style described in the article before mentioned, is to be tested, the flue for the conduction of the smoke should be made at several points on the outside walls, at the bottom, so as to retain the heat and fire and not allow them to pass directly out before using all their combustible properties; and the feed for fuel and air should be brought in and made as central as possible. With these conditions, the tests would have shown far greater heat, inside and out, and with the application of water the complete demolition of several of the structures would have been speedy, and those having any wood in their construction would have shown the serious results of such use. Respectfully yours, CALDRON.

IMPORTANT TO FELLOWS OF THE AMERICAN INSTITUTE OF ARCHITECTS.

PROVIDENCE, Sept. 28, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Permit me through the columns of your journal to appeal to the Fellows of the American Institute of Architects to return to me their letter-ballots on the proposed change in the Constitution of the Institute. A two-thirds vote of all the Fellows, that is, 312 votes, is required to carry a Constitutional amendment.

But a little more than one-third of the Fellows have returned me their votes. It is important that the vote be large enough to show the wish of the Fellows on the proposition of amendment.

Ballots mailed later than October 8th, should be sent to me at the St. Nicholas Hotel, St. Louis.

Yours truly, ALFRED STONE, *Secretary.*

P. S. — Since writing the above, I have read Mr. Macomb's comments upon the proposed amendment to the Constitution, and would say that he has stated correctly the issue, which is, whether the affairs of the Institute shall be managed by twenty-nine Directors or by certain officers of the Institute less in number, and as the Constitution of the Institute can only be altered by letter-ballot, it was thought best to phrase Article IV in such a way as to leave the utmost freedom of choice on the part of the Convention as to the number to constitute the Executive Committee, and as to who should compose it.

If the amendment is approved, the opportunity to discuss the question of centralization or de-centralization of power will be legally before the Convention, and under the proposal to amend the By-laws there will be an opportunity to hear and be heard on the subject, and the adoption of the amendment will not prevent making the Executive Committee of any number that may be deemed best. I therefore do not hesitate to urge Fellows of the Institute to vote for the amendment to the Constitution, even if to some the designation "Board of Directors" is better than "Executive Committee," because by so doing, the whole question will thus be open for argument in the Convention, and I do not feel that I am committing myself on the question of a large or small governing body. A. S.

RAIN-BATHS: A PERSONAL EXPLANATION.

NEW YORK, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The fact that a portion of your issue of February 10, 1894, containing a valuable article on "The Modern Rain-baths" has been sent to me from the Paris office of the "*Annual of the Universal Medical Sciences,*" of which I am the associate editor on hydrotherapy, climatology and balneology, convinces me that your journal is influential and the circulation widespread. This fact moves me to ask the correction of an error on page 317, in which occurs the following sentence: "Quite recently rain-baths have been introduced into the United States, largely at the suggestion of a hydropathic physician, Dr. S. Baruch, of New York City, etc." My grievance lies in the epithet "hydropathic physician," which does me an injustice. It seems difficult for lay people to realize that the medical profession regards all physicians as irregular who practice or profess some exclusive dogma. A "hydropathic physician" is one who depends, or professes to depend, upon water as the chief remedy in disease. I beg to say that I do not belong to that category.

Since my first argument for the rain-baths was presented in my report as Chairman of the Committee on Hygiene of the Medical Society of the County of New York (the largest and oldest medical society in the county), I certainly cannot be classed as a hydropathic physician. Moreover, the title-page of my "Plea for Public Baths," which the author of the article in your valuable journal had obtained from me, states my connection with three hospitals in which no hydropathic physician would be recognized.

It has been my endeavor to further the hygienic utilization of water as well as its application in disease in an exact and scientific manner. As a true physician I use water as one of many remedies. This is called hydrotherapy, and differs from hydropathy in that the latter is a system of medicine claiming to be based upon the use of water as a remedy in place of medicines.

It may not be without interest to your readers to state that the New York rain-baths, referred to by the paper in your February number, have been astonishingly successful. Over 175,000 baths were given in 1893. I am just in receipt of the last report of the Peoples' Bath. From October, 1893, to same date in 1894, 80,537 baths were given, an excess of 11,908 over the previous year. When the fact is borne in mind that the entire area of the building (two stories and basement) is only 61.7′ x 27′, architects and all others interested in public baths must realize the superiority of this method over all others (plunge, tub, etc.), as indicated in the excellent article of Mr. Gerhard.

The Riverside Association, at 259 West 69th Street, has constructed a similar bath, in which basement space of 68′ x 25′ is used. Here we have thirteen bathing compartments, a laundry, drying-room, toilet and wash rooms. In this space we have on several Saturdays given 350 baths.

These illustrations suffice to demonstrate that *no public bath should ever contain tubs,* the rain-bath being ideal for this purpose. The free public baths, provided for by the last Legislature and which are now about to be constructed in this city, will be rain-baths, this form having been determined upon by the City Board of Health.

Respectfully, S. BARUCH.

A PROBLEM IN KALSOMINING.

BAKERSFIELD, CAL., September, 21, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you kindly tell me how to treat a plastered wall for kalsomining, when one has to contend with a considerable quantity of alkali in the sand with which the mortar was mixed?

Very truly yours, B. G. MCDOUGALL.

[IT will be found very difficult to do anything with the wall. In England, walls plastered with salt sand are often covered with tin-foil, and then papered, as the only means of getting any decoration to stand on them; and kalsomine, which is easily injured by alkali, independent of the moisture which the alkali may attract, is still more difficult to manage. We should be inclined in this case to try a coat of clear Portland Cement, mixed to about the consistency of whitewash, over the wall, letting this stand some weeks, to throw out the "saltpetre," before kalsomining over it; but we should notify the owners that the experiment would be quite likely not to succeed, and that it might be necessary to take the plastering all off, and do the work over again. — EDS. AMERICAN ARCHITECT.]

THE ROSENBERG BEQUESTS TO GALVESTON.

GALVESTON, TEX., Sept. 23, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I take the liberty of enclosing copies of clauses 19 and 20 from the will of the late Henry Rosenberg, of this city, who died in 1893. These follow in regular order the Y. M. C. A. building just now being placed under contract. Their publication may, no doubt, prove of interest to those of your readers likely to compete for these works. If such is your own view, you are at liberty to make use of the data they contain. I add for your own information a memorandum of the progress made in the erection of several buildings provided for in his will as bequests to the city.

I am, very respectfully, A. J. WALKER.

Two of the bequests contained in the will of the late Henry Rosenberg, of Galveston, who died May, 1893. These follow the Y. M. C. A. Building which we hope to have under contract early in October.

A. J. WALKER and W. J. FREDERICK, *Executors.*

CLAUSE XIX. I give $50,000, Fifty thousand dollars, for the erection of an appropriate Monument in the City of Galveston to the memory of the Heroes of the Texas revolution of 1836. The execution of this bequest is charged upon my Executors, who shall adopt plans and have the monument erected under their immediate supervision!

NOTE. — This bequest is intended to commemorate the events and incidents, as well as the individuals, participating therein. These can be obtained from the histories of Texas, of which there are a number by different writers.

CLAUSE XX. I give $30,000, Thirty thousand Dollars, for the erection of not less than Ten Drinking-Fountains for man and beast in various portions of the City of Galveston, localities to be selected by my Executors. This bequest however is on the proviso, that the City of Galveston shall obtain an abundant supply of good drinking-water within 5 years after my death. Failing in thus obtaining such supply of good drinking-water, then I direct that after the expiration of the time herein limited, one-half of said Thirty thousand dollars shall be given the Orphans' Home mentioned in the 14th clause of this will, and the other half to the Women's Home mentioned in the 17th clause of this will!

NOTE. — The new system just completed in August affords an ample supply of good fresh drinking-water in great abundance and renders this bequest operative.

MEMORANDUM OF OTHER BEQUESTS TO THE CITY OF GALVESTON.

14. Protestant Orphan's Home, $30,000, three stories: will be completed October 1, 1895.

15. Grace Episcopal Church, $30,000: will be completed and occupied October 10, 1895.

17. Women's Home, $30,000, three stories: will be finished and occupied November 1, 1895.

18. Y. M. C. A. Building, $65,000, four stories: architects' plans adopted and proposals invited.

19 and 20. Monument and fountains, $50,000 and $30,000.

21. Public Library — Residuary — Building, Equipments and Endowments. Balance of the estate, estimated, $300,000.

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EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

St. Louis, Mo.— *Art Exhibition at the Exposition, including Special Collection of "Pictures of the Glasgow School."*

NOTES AND CLIPPINGS

Electric Heating at the Vaudeville Theatre, London. — The Vaudeville Theatre, in London, was recently equipped with electric heaters and those interested will find a brief description of the plant, with illustrations of the heaters, in the London *Electrical Engineer*, March 8, 1895, page 285, and in the London *Electrical Review*, March 8, page 293. It appears that there are six box radiators on either side of the theatre, and twelve attached to the partition in front of the orchestra; there are four large portable radiators arranged for use in different parts of the theatre; the average temperature of the theatre is about 60°; arrangements are now being made to heat the stage in the same manner. The current actually used for warming the auditorium is 90 ampères and 110 volts, which, at 8 cents per kilowatt hour, is 75 cents per hour, which, for an evening of four hours, amounts to $3.00. One of the great advantages is perfect regulation and the conveniencies attending the system. From a comparison with a hot-water system, it is claimed that the electrical system will probably cost considerably less to maintain. The cost of installing the electric heating apparatus was found to be about the same as that for hot-water heating; the advantages of the former, however, are said to be so great that they would have justified even a higher price. Electrical heaters are on trial at several other theatres and public buildings, in some of which they are used for temporary assistance in extra cold weather. The whole installation was completed, at a few hours' notice, early in January of this winter. In connection with the economy of electrical heating, the following from the recent paper of Mr. Crompton (abstracted in the *Electrical World*, May 18, page 587) may be of interest. He claims that the opinions recently stated, that electrical heating for cooking is too expensive to become general, are based on an insufficient knowledge of the economy of cooking as generally carried on; the smallness of the results obtained by the electrical method are astonishing; the amount of heat actually utilized in cooking on the ordinary stove was found by experiment to be not more than 2 per cent; the enormous waste, except in boiling and stewing, being due to the fact that radiated heat was used; in an electrical oven fully 90 per cent of the heat may be used, which represents 4 5 per cent of the whole energy of the coal, which is therefore twice as economical as the ordinary oven; evidently it does not follow that therefore it would be more economical in a private house to generate electricity for cooking purposes only. He believes that in a few years the majority of the consumers of electric light will do all their cooking by electrical means, using solid fuel only for boiling purposes. — *Carl Hering in the Proceedings of the Engineers' Club of Philadelphia.*

A Warning for Travellers in Austria. — Of course, Austrians are treated in exactly the same way as foreigners, the only advantage they possess being a better knowledge of the shoals and quicksands of the law. But even this is only relative, as many a native knows to his cost, a Vienna merchant, Herr Lieweher, among the number. This gentleman was seeing a lady off not long ago, at the Western terminus. In order to meet or see a friend off at the railway station in any part of Austria you must first get a ticket for the platform and then wait patiently in a room until the doors are thrown open, after which each ticket must be duly punched, and then only is one allowed to enter. Herr Lieweher, however, fulfilled all the conditions, and accompanied the lady to the compartment in which she took a seat. Here he engaged her in conversation, and it was only when the third bell sounded that he became conscious how quickly time can fly. He left the train and turned his steps toward the exit, when a railway official accosted him and informed him that he must pay a fine of three florins for having entered the train without a ticket. Herr Lieweher said he had never heard of such a law or by-law, and that he did not think he ought to pay the money, whereupon, without more ado, the official called upon the police to do their duty. This roused the merchant's ire to a degree of defiance, and he said he would not endure such things at the hands of a railway official; that it was impudent and impertinent. Herr Lieweher was then taken before the Commissionary and fined three florins for entering the train, and fifteen florins for the too free expression of his opinion. These sums he was compelled to pay then and there, and only when he had done this was he allowed to leave the station and reflect upon the unforeseen miseries of life. But even then his trials were not terminated. The payment of eighteen florins merely ended the disciplinary punishments. The unfortunate man was brought up a few days later before the district judge to answer to the charge of having used insulting words to a functionary in the discharge of his duty. The case having been carefully and fully gone into, as is usual in Austria, the judge condemned Herr Lieweher to pay twenty-five florins more. This, it is hoped, will be the last of the series of punishments which sprang from seeing a lady off; but one can never tell. — *N. Y. Tribune.*

Progress of the Tunnel under the Thames. — The Blackwall Tunnel is soon to be an accomplished fact. Work is now proceeding very rapidly; that is to say, the human moles shut up in compressed air underneath the bed of the river are grubbing their way along at the rate of from 12 feet to 15 feet a week, and if they are able to maintain this rate of advance for the rest of the distance their tunnel will reach the first caisson on the Middlesex side of the Thames about the first week in October. If that should be achieved, then this subaqueous portion of the work, 1,215 feet in length, will have been got through within a twelvemonth, a feat never before accomplished in the time. It has been a difficult and a dangerous task, and it is to be feared that the portion now remaining to be done, 100 or 125 feet, may prove the most troublesome of any. In evidence of this it may be stated that the contractors, Messrs. Pearson & Son, have just purchased additional pumping machinery, they have applied for and have obtained from the Thames Conservancy permission to throw down into the river an additional covering of clay, and their men are actually working at this moment under an air-pressure of 34 pounds to the square inch over and above the ordinary atmospheric pressure in caisson No. 2 — considerably greater than they have ever had to resort to before. The regulation of this air-pressure is rather ticklish business. They are within 76 feet or so of the low-water margin of the river, but the whole of the river-bed at this point consists of loose porous shingle. Without great pressure below they would have the water in upon them, by its sheer weight; on the other hand if they overdo their pressure, it is liable to blow off up through the bed of the earth and the water above them. Then, of course, the pressure is gone, and in would come the deluge. How real is the peril of this kind of work has just been illustrated by an accident near Melbourne, where a sewer is being constructed under the Yarra by the ordinary shield system. The water came in upon them, and the engineer of the work and five of his men were drowned together. This Blackwall Tunnel is, of course, a much larger and more formidable undertaking, and it is perhaps this very fact that has secured immunity from serious mishap. The possibility of an inburst of water has, of course, been foreseen, and the consequences to life and property that might ensue have been so appalling that no pains have been spared to guard against a calamity. No less than 30,000 cart-loads of clay have been brought up from the Medway and laid down over the tunnel course. — *London Daily News.*

Statuary for the Pont de la Concorde. — It is proposed, says Mr. Parminter in the *Building News*, to restore the original aspect of the Ponte de la Concorde under the Empire and the Restoration, by replacing the statues of celebrated men on the immense pedestals of the parapets, which have remained unoccupied since Louis Philippe. The ten or twelve colossal statues erected on the Pont de la Concorde by the Restoration in 1827, replacing the immense statues of generals raised under the Empire, were taken down under Louis Philippe, and placed in the Court of Honour at Versailles, for it was the opinion of the architects and engineers of that time that their enormous weight was sufficient to compromise the solidity of the remarkable work of Peyronet. This bridge was commenced in 1787, and finished in 1790, and constructed in its upper portion with stone coming from the demolished Bastille; the heavy statues placed on the parapets by Napoleon and Louis XVIII threatened to bring about the ruin of the bridge, and were taken down in 1841. It would, therefore, be very absurd to-day, when the traffic over the bridge is increased tenfold, to re-erect the old statues with their enormous dead weight. It is, however, necessary with regard to harmony and proportion that the statues should be of very large dimensions. It will, therefore, become the duty of chemists and metallurgists to unite themselves with the sculptors, and furnish a light and malleable alloy, such as aluminium combined with some other metal, for the construction of the fine statues with which it is proposed to ornament the Pont de la Concorde before 1900.

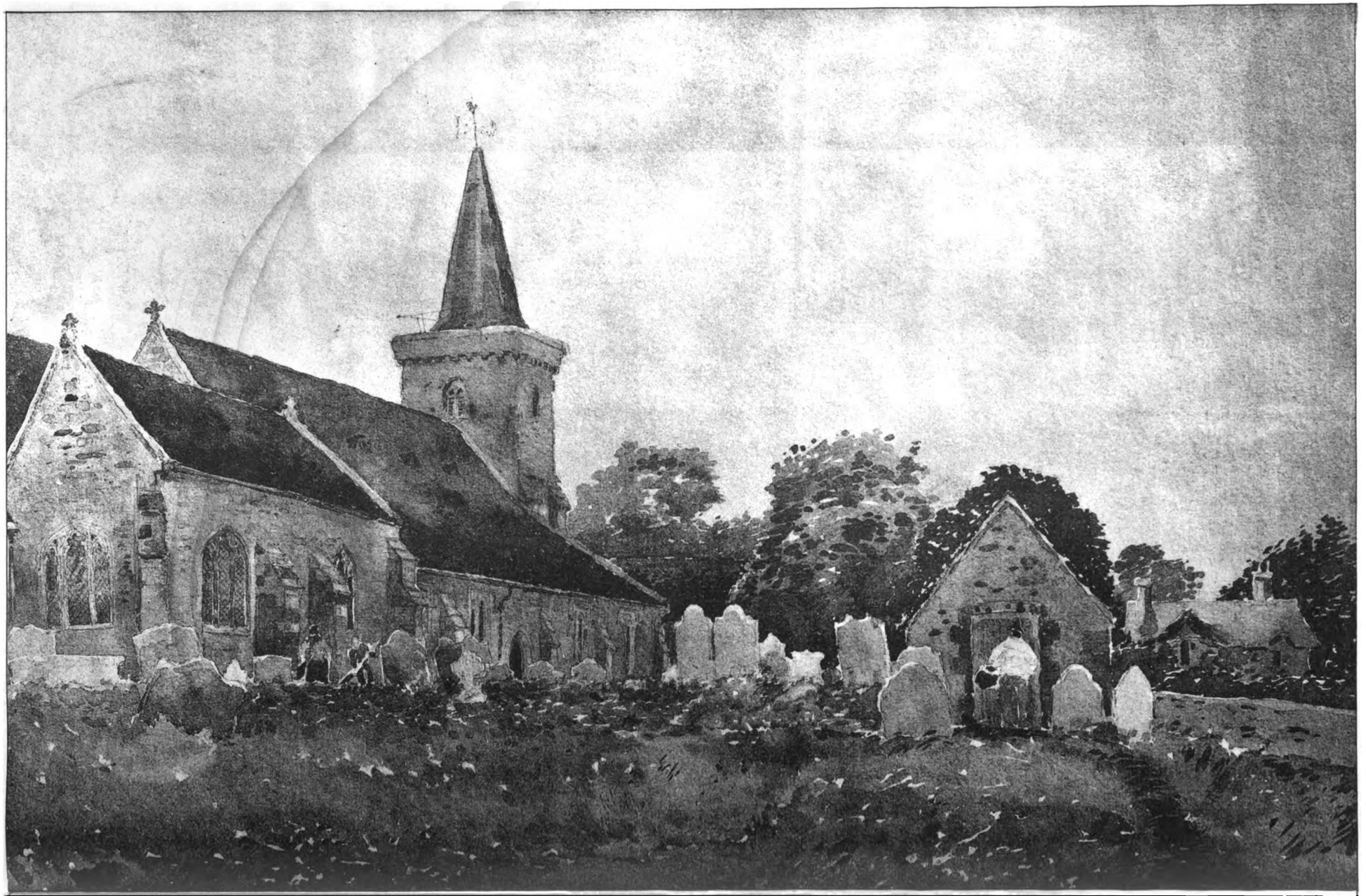
The Difficulties of Sewering New Orleans. — When it is remembered that the city of New Orleans is built upon land whose average level is some twelve feet below the surface of the Mississippi River and that the entire municipality will be protected from the encroachment of the water by continuous levees surrounding the city, it becomes evident that the problems of draining and sewerage present difficulties which cannot be easily overcome. The average annual rainfall in New Orleans amounts to sixty or seventy inches, and showers yielding from two to four inches are not uncommon. All this water is collected in drainage canals and is lifted over the levees into the river and into Lake Pontchartrain by means of pumps. The old system, however, is inadequate for the present needs of the city, and a new plan is proposed to drain the central part of the city by means of a great canal finding its outlet through powerful pumping works into the Bayou Bienvenu and thence into Lake Borgne, far from the city and its water-supply. The sewerage system of New Orleans is independent of its drainage system. It consists of sewers emptying into a central reservoir, whence the sewage is pumped over the levees into the river. Recently a plan has been adopted for reinforcing the old system by a new canal and reservoir which shall receive the flow of the old sewers. The new reservoir will be twenty-seven feet below the gulf-level and will be fitted with pumping-engines capable of discharging 45,000,000 gallons a day. It is expected that the system as planned will provide a rapid current in the sewers, and the effective and speedy discharge of all sewage into the river-current at a point far enough below the city to insure perfect sanitation. — *N. Y. Evening Post.*

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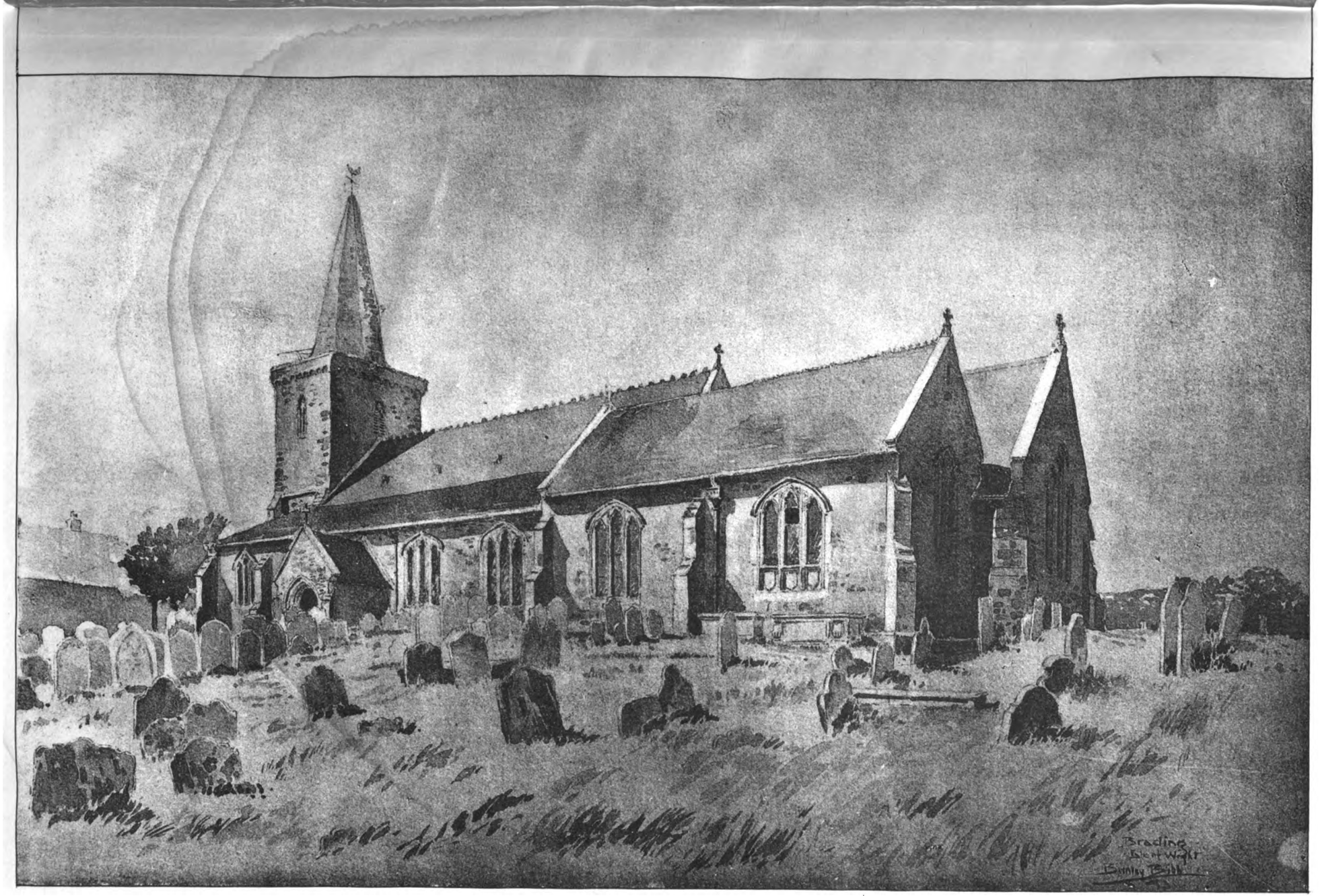
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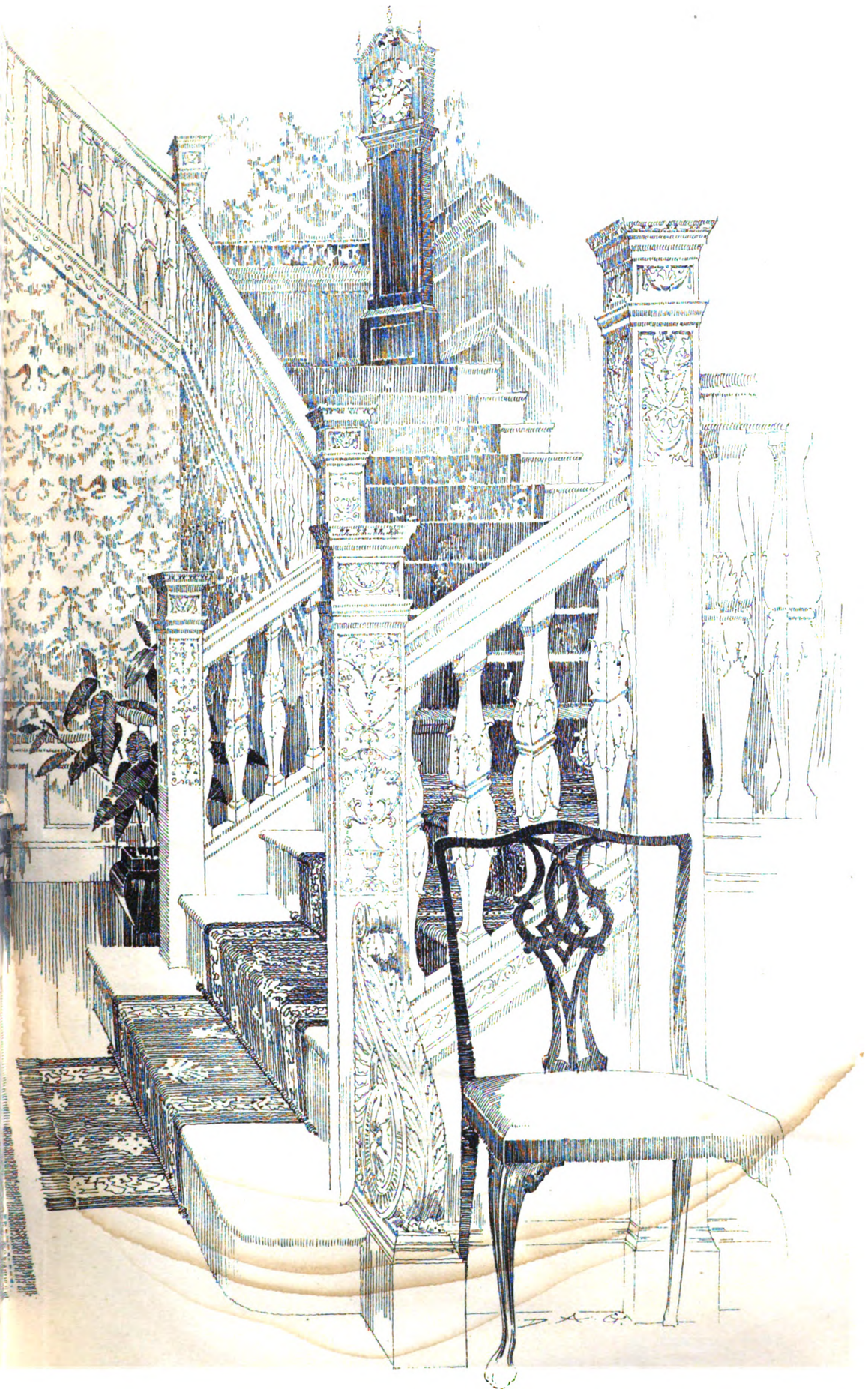


STAIRCASE-HALL: HOUSE OF DR. W. S. BRYA

WILLIAM Y. P

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. L

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THE conscientiousness of the new head of the New York Building Bureau seems to have involved him in trouble with the architects, who are kept waiting for an unreasonable length of time before their plans are acted upon, or while a discussion is going on about trivial points. A story is told of an architect who submitted a plan for a one-story building, thirty-five feet high, with a wooden cornice, extending two feet above the roof. The New York law permits the erection, in some portions of the city, of wooden buildings not more than thirty-five feet high, but the clerk who examined the plans argued that the cornice must be included in the thirty-five feet; and it was four months before the architect was able to get a decision by which he was allowed to build according to his design. Meanwhile, plans submitted by him for a similar building, but with a cornice several feet higher, had been approved without difficulty. In another case, reported by the *Real Estate Record*, the architect is said to have been required to make affidavit that a floor, formed of concrete lying on rock, would sustain a load of a hundred and fifty pounds per square foot, before his plans were approved. It is evident that these absurdities are the result of too great pressure on the Department, in consequence of which the examination of plans must be confided to subordinates who know very little of the subject, and whose anxiety to do their duty takes the form of an unreasonable fussiness, from which building interests undoubtedly suffer greatly. As we have before suggested, the best remedy seems to consist in the appointment of a number of professional architects, in different portions of the city, to act as district surveyors, with the duty of examining plans for new buildings or alterations in their district. This system works well in London. As the examination of plans does not require all the surveyor's time, he can carry on his private practice, the consequence of which is that men of the highest attainments are secured for this important duty, in place of ignorant clerks. After the approval of the plans, the supervision of their execution would, of course, fall upon the regular inspectors.

WE print in another column a letter from Mr. Edward Atkinson, in reply to some observations of ours as to the influence of the Underwriters' Association upon building. Of course, Mr. Atkinson is right in the comments on the subject in general, but he thinks that our words cast upon the Underwriters the "imputation" of being "responsible for the neglect of owners to build safe buildings, and also for the neglect of owners to take proper measures for preventing them from being destroyed after they have been erected." In answer to this, we disclaim emphatically all intention of casting "imputations" on any one, but the absence of a wish to blame any one for the present state of things does not enable us to shut our eyes to the fact, which is familiar to every architect, that, in the great majority of cases, improved provision against fire is made in new buildings in consequence of the saving in insurance premiums, for the owner of the building and his tenants, which will be secured thereby. Architects, it is needless to say, are not often admitted to view the workings of the consciences of their employers; and the question which is propounded to them in such cases is not, "Does duty require of us this sacrifice?" but always, "What will be the saving in insurance rates if we build as you propose?" When a reply to this inquiry is given, a process invariably follows of comparison between the saving in rates, and the interest on the extra cost of the safeguards suggested: and on the result of this comparison depends the decision whether they shall be adopted. Whether this is ethically wrong or not, is a matter which it is not within the province of architects to decide. The case is somewhat similar with the building-laws. As Mr. Atkinson says, owners are very apt to try to evade building acts and to grumble about them when they are enforced. He thinks that this is evidence of "incapacity," if not of a worse moral condition; but architects, who see their clients obliged to compete in rents with the owners of buildings erected under regulations much less rigorous, or, perhaps in open violation of all regulations, look with more indulgence upon their anxiety to make all possible economies, although, with regard to the building-laws, architects rarely countenance anything short of full compliance.

WE have often expressed our opinion that the best and simplest way out of the difficulty was not to lecture owners on their "incapacity" for promoting what they imagine to be the interests of the Underwriters who do the lecturing, but to impose on them a tangible portion of the responsibility toward their fellow-citizens which, under the present system, they incur only in the abstract. A man who, from a reckless and selfish pursuit of his own immediate interest, builds in such a way that his building endangers his neighbors, unquestionably incurs a moral responsibility; and, if his wretched fire-trap, in burning, sets fire to another building, and people are burned to death in the latter, he is accountable for their death, just as much as if they had been gored by a mad bull that he had allowed to run at large, or had died in consequence of any other neglect on his part of the reasonable regard for the safety of others which the common law imposes upon all persons. We have been so long accustomed to the idea that, while a man cannot build a pigsty, or stable, or other disagreeable but comparatively innocuous affair, beside his neighbor's house, without becoming liable in damages, he is at liberty to set up a shed of pine boards against the party-wall, and fill it with barrels of naptha, and allow it to be burned down every six months, carrying his neighbor's building with it, that the impunity which he enjoys in the latter case seems to us to be in some mysterious way an inborn right, transcending all notions of moral obligation or common sense. As a matter of fact, however, it is purely a statute privilege, originally conferred upon our English ancestors by an Act of Parliament, which ordained that no man should be held responsible for the consequences of the spread of fire from his own building to that of his neighbor. This statute, like many others of the kind, which were in force in the English colonies at the time of our Revolution, was adopted into the common law of the States formed from those Colonies. No country, outside of the British family, knows any such rule, either in statute or common law, neglect of precaution in regard to fire being in France, or Italy, or Spain, or Germany, or Austria, just as grave an offence against a neighbor as neglect of proper precautions in regard to the straying of dangerous beasts, the escape of foul odors, or any other source of danger or annoyance to innocent people outside of one's own territory. It would be too much to expect our people, after centuries of exemption, to be willing to assume all at once such responsibility toward others in case of fire extending beyond their own premises, as is imposed upon a Continental householder; but the principle of such responsibility is unquestionably just, and would, as we think, in many of its applications meet with general approval. For example, it is a common occurrence to have the insurance policies on well-built structures cancelled, and new ones ordered, at treble or quadruple rates of premium, on account of the erection in the neighborhood of buildings considered to be bad risks. Of course, the Underwriters are justified in increasing the rates on the good risks,

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in proportion to the new hazard introduced by the erection of the dangerous structures near by; but it is certainly hard for the owner of the good buildings to be obliged to pay, and pay dearly, for the doings of a neighbor over whom he has no control whatever. In France, or Spain, or Germany, or Italy, the owner of the fire-trap would have to pay the extra premiums imposed upon neighboring property as a consequence of the erection of his building; and it is obviously fair that he should do so. That he should be relieved in our States of this burden by the common law is an injustice, which should be, and probably might be, if the case were fairly presented, remedied by statute; and the Underwriters can say, better than any one else, how important would be the effect of such a statute, on the construction of buildings. That it would be very important, there can be no doubt, and the architects could be depended upon to coöperate with the owners in any efforts to reduce such external risk.

WHETHER anything can be done to improve a state of affairs in which owners, as a rule, build as cheaply and showily as they can, in order to make their buildings attractive to tenants as parsimonious and reckless as themselves, while the equally reckless Underwriters compete with each other in the price of the contracts of indemnity which it is their business to furnish, is a question which interests architects, in their capacity as intelligent citizens, quite as much as any one else. Although, as professional advisers, they may not think it wise to urge their clients too persistently to erect buildings which will pay only four per cent interest, instead of cheaper ones which will pay six per cent, they are by no means insensible to the burden which the erection of the latter sort lays upon the community at large; and most of them, we are convinced, present to their clients the higher consideration of the subject as frequently and forcibly as their tact shows to be judicious; and no one would welcome more gladly a reform in building methods, reasonable enough to commend itself to the public, more heartily than the members of our profession.

ANOTHER building accident took place in New York the other day. A reckless attempt was being made to hoist at once three steel girders, weighing three tons, by means of a derrick, to the sixth floor of the new Johnston Building, at the corner of Broad Street and Exchange Place, when the boom of the derrick broke, dropping the load on a stone cornice, and carrying away a part of it. The blocks of stone fell on a platform, on which a man was at work dressing the cornice, and broke it down. The workman fell to the street below, and one of the blocks fell upon him, inflicting injuries from which he died a few minutes afterward. Arrests were promptly made of the men in charge of the derrick, and of the bystanders who seemed likely to be useful as witnesses, and the task of fixing the responsibility for the accident will probably be easy.

THE eight-hour law made its appearance in court the other day in an instructive fashion. Every one knows that the labor magnates have procured the passage of a statute, by which eight hours constitutes a day's labor in Government work, and certain penalties are provided for attempts to extend the time during which a man is at liberty to labor for the public. Lately, an appropriation has been made for strengthening the Government Printing Office Building, which has been on the verge of collapse for a long time and the work has been begun. The engineer officer in charge of the alterations was discovered a few days ago, in the act of having his men work more than the statutory eight hours, and a complaint was promptly lodged against him by the defenders of the dignity of labor. On his appearance in court, to answer to this terrible charge, the officer, Lieutenant Sewell, created a sensation by explaining quietly that the building, in which twenty-seven hundred people are employed, might fall at any moment; and that he judged the emergency sufficient to warrant him in keeping the men, on whose labors the lives of thousands of their fellow-citizens might depend, at work for a longer time each day than the apostles of industrial slavery approve. Whether this defence prevailed, we cannot say; but it is probable that the public of Washington will support Lieutenant Sewell in his sinful course, whether the walking-delegates approve his conduct or not.

A REMARKABLE increase in the number of cases of typhoid fever in Chicago, where there have been recently eleven deaths from the disease in a single day, has attracted the attention of the citizens again toward the water-supply. Since the extension of the main water conduit two miles farther into the Lake, the water furnished to the older part of the town has been tolerably pure, and the mortality from fever is alarming only in the Lake View and Hyde Park districts. Here, as inquiry has shown, a special and dangerous source of contamination has been found in the filthy refuse which is now being dredged from the Chicago River, and which, by order of the United States engineer officer in charge of the work, has been dumped into Lake Michigan, less than two miles from the main four-mile crib, and in such a position that the current takes the lighter portions toward the Hyde Park intake. As a consequence of this judicious proceeding, the water-supply of the Hyde Park quarter is found to be horribly polluted, and the Board of Health has directed that all the water used for drinking or cooking must be boiled. After the discovery of the source of the pollution, the representations of the citizens led to a change in the dumping-ground, which has now been shifted to a point three miles from the main crib; but the fever does not seem to abate materially, and it probably will not until dumping of such vile matters into the Lake ceases altogether.

THE Sixth Annual Convention of the National Association of Commissioners and Inspectors of Buildings is to be held in Baltimore on Tuesday, October 15, and the two following days. This Association, though young, has already shown itself an important factor in the development of the art of building. As architects can well believe, the officers who administer and interpret the building-laws in our great and busy cities have an immense number of perplexing questions to answer, and difficult problems in construction to solve; and an annual comparison of notes between them must do much to correct misapprehensions, and promote uniformity of practice and interpretation.

A CURIOUS case came up in a New York court the other day. It seems that the New York Legislature passed, in 1888, a statute, giving the manufacturers of gravestones and monuments a lien on their goods, wherever placed, until they are fully paid for. A Mr. Brooks, some two years ago, ordered a monument to be set in his lot in Greenwood Cemetery, where his wife and daughter are buried, and certain other work to be done about the lot, the total bill amounting to eighteen hundred and fifty dollars. He paid five hundred and fifty dollars on account, in cash, and gave notes for the balance. Before the notes came due, his affairs became embarrassed, and he was unable to meet them, although he tried to borrow money from his friends for that purpose. Last January, the monument-dealers filed with the Superintendent of the cemetery a notice of lien, and subsequently threatened to dig up the monument and the smaller stones, and sell them at auction, to satisfy their lien; whereupon Mr. Brooks applied for and obtained, a temporary injunction, restraining them from making the sale; and brought suit to have the injunction made permanent. The latter suit was argued a few days ago. On behalf of the dealers, it was claimed that they had acted strictly within the statute of 1888; while, on Mr. Brooks's part, it was argued that the law was unconstitutional, not only as permitting the removal of what has become attached to the real estate, but as giving a certain class of citizens, namely, monument-makers, privileges denied to other citizens. The judge reserved his decision, but improved the opportunity to express his opinion that the statute of 1888 was "a most outrageous law." "It was almost inconceivable," he thought, "that the Legislature should give any person a lien on the place where the dead are buried." The counsel for the dealer suggested that such a law was necessary to prevent people from ordering large monuments which they do not intend to pay for; but the judge replied, with considerable force, that the dealers might have protected themselves by requiring immediate payment. "If the defendants knew," he said, "that they could not recover, they would not have sold this monument on credit"; and he added that, in his judgment, such laws did more harm than good, by encouraging people to sell goods on credit; and that, in such cases, the man who sold on credit was as much to blame as the one who bought.

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ART IN THE MODERN CHURCH.[1] — II.

RELIGIOUS AND IRRELIGIOUS ARCHITECTURE.



From the *Building News*.

IT is well to distinguish between a building for religious purposes and religious architecture. Any sort of a building may be used for religious purposes. An upper room served for the institution of the Last Supper, and from that time on the faithful frequently had to worship in places whose origin was without religious signification, and which were never, from the outset, intended to be utilized in such a manner. Such structures need not concern the designer of religious buildings. They are governed by no rules, they submit to no laws, they have no peculiar properties or characteristics to distinguish them from other buildings.

The scope of religious architecture is wholly different and distinct. The student who will take the trouble to run through any history of architecture cannot but be struck by the great space consumed by the architecture of religion. Of many periods its buildings are alone those that survive to tell us what manner of architecture their builders produced. The very volume of the remains is impressive testimony to the importance of this phase of art. It shows how, in all time, religious architecture filled the thoughts of the builders, and how deeply rooted in the human mind is the necessity and the utility of religious architecture.

But history tells us more than this. In every great period of architectural activity we have never to ask which building is set apart for religious or which is put to ordinary domestic or civic purposes. Religious architecture has always been distinctive and individual. Often its forms have differed from those employed in other structures, and if we cannot always trace in Pagan architecture that feeling for religion that distinguishes Christian architecture in its highest form, the buildings have always had a character of their own distinct from secular structures. Architectural history tells us farther that religious architecture has commanded the best talents of all architects of all times. It is true there have been epochs, as that of the Renaissance in France, in which the civic and domestic buildings were larger and more splendid than the churches built at the same time, save in one or two exceptional instances, of which St. Peter's at Rome is the most conspicuous example. Certainly the châteaux of the French Renaissance period surpass in beauty and in thoughtful expression, in elaborateness and in splendor, their contemporary churches. But the churches had already been built. Scarce a town in France that did not boast one or more and often many wonderful monuments of the earlier period of pure Christian art. There was no need for newer churches in the new style, and so the genius of the architects found expression in a new class of buildings that surpassed the older in the magnificence of their appointments and in the beauty of their art.

This was a time in which extraordinary conditions prevailed, and the general law did not hold; but save in such circumstances, and in our own day it may be asserted that religious architecture has always commanded the best thought of builders, brought out their finest creations, absorbed their most brilliant imagination, made use of their utmost powers — not always in an identical manner nor to the same degree, for religious architecture has had many and varied forms, just as it has served the need of many and varied forms of religion.

I am not now concerned with the history of religious architecture as a whole, but with Christian architecture, which is what we naturally have in mind when speaking in this way. Frequently we use these words most irregularly and without thought of their true meaning. We speak of a church as an example, a type, of religious architecture, because we know it is used by some religious body for sacred worship. We use the word "religious" in this connection in a generic sense and not because we pause to consider just what the combination "religious architecture" may really mean. It is true enough that any sort of a building may, if we choose, or if circumstances compel it, be put to religious uses, or may be temporarily modified to suit the exigencies of worship or of ritual; but when we start to build a church we must be more logical and circumspect. Because any sort of a building can be used as a church does not give us the privilege nor the right to build any sort of a structure when we set about building a church.

Various religious bodies require certain things in their church buildings. Those with an elaborate ritual need a stately edifice to set off the solemnity and the majesty of the ceremonies. Those in which the preaching service is the chief feature make use of what is almost a lecture-hall, if it is not absolutely such. Others require chapels; some ask for meeting-rooms, places of recreation, parlors, kitchens and gymnasiums. The modern church, even in the non-liturgic communions, is rapidly becoming as varied and as complex, in its way as a mediæval cathedral, with its great church, its many chapels, its cloisters, its chapter-house, its hall of records, its palace for the bishop and dwellings for his clergy. Into the specific architectural requirements of these structures we need not inquire, no more than we have need to search out the truth of the various creeds they represent. But, however varied these buildings may be in their uses, they have this in common — that the church, the house of God, is the central idea of the whole. However complicated a group a modern church may be, this fact is never forgotten, or rather is intended never to be forgotten; it is the end and aim of the work.

We shall find, as we proceed in the study of modern church designs, that sundry devices are employed by architects of every sort as so much stock-in-trade, the symbols, the emblems, the language, so to speak, of church architecture. Such are high sloping roofs, towers, pinnacles, doors, windows and the like. We are accustomed to see certain architectural forms employed in a more or less technical manner to form what we at once recognize as a church without having to be told it is one. These forms may be bad, they may have no relation to each other or to the special purpose for which they are employed, but we readily recognize them, knowing the building to be a church, because it corresponds to our mental conception — which we have learned and differentiated by seeing other similar examples — of what a church should be like.

There is nothing sacred in a high and sloping roof. One of the finest examples is that of the great hall of William Rufus in Westminster Palace; a hundred châteaux in France have roofs of similar form; and it would be a task of no mean order to catalogue all the civic and lay buildings in Europe which are covered in this manner. Surely the form of a roof is not sacred, nor can it of itself suggest sacred ideas. A tower is another feature frequently employed to distinguish our modern churches from other buildings. Towers were first used as a means of defence, and are so employed to this day. It is true many types of towers have been devised that are only employed in conjunction with church buildings, but the idea of a tower is not sacred, nor is the form. And so with other parts. Doors, windows, arches, walls, which we employ in the church designs are freely available for all other sorts of structure. We might, in truth, as well maintain that only brick or stone should be employed in the church building, as to say that any of these things is the peculiar property of the architect of the church.

As has already been said, it is not *what* we use in the church that has a sacred significance, but *the way* in which it is used. Religious architecture is religious from the religious spirit put into it. That, and nothing more.

But how often do we ask our architect, when we go to him for a design for a church, if he has thought of this in preparing his sketch? How often do we ask him if he has felt it was a consecrated task he has set himself? How often do we inquire if the religious phase of architecture has been considered as well as the utilitarian and the artistic? How often do we ourselves realize that this must be the fundamental element in our church building?

We talk glibly of styles, we state our preferences in aisles and columns and arches; we pick out towers that strike our eyes; we recall convenient features we have noted in other churches; we insist on requirements already carried out in other buildings that seem peculiarly adapted to our needs. And when we have discoursed on these things, and when our architect has met our wishes, or pointed out some other tower that would look better than ours, or shown that a certain form of windows was better than that we had chosen; when, in a word, the two high contracting parties have

[1] Continued from No. 1032, page 5.

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reached a common agreement as to materials, all has been said and done that seems needful, and the result, with this as a basis, is forthwith awaited. It is the same process we would employ in getting a design for an hotel, or for a business building, or for a dwelling. The distinctively churchly aspect of the matter, its religious aspect, is, in the very great majority of cases, omitted altogether; forgotten, neglected, unknown.

It is proper, in this utilitarian age, that every question of practical utility in a church building should be carefully considered. The financial element comes first, sorrowful as it may seem, for we cannot build our church beyond our means, though we mortgage it heavily and incur large indebtedness. We need, too, to consider the requirements of our congregations, the seating capacity, the purpose of the church, whether liturgic or not, the accessory buildings and rooms, the amount of space at our disposal, the conveniences of modern worship, doors, stairs, access, distribution, heating, ventilation, lighting — the thousand exigencies that enter into the building of every building, and which must be properly considered and settled in every well-ordered architectural work. But these things enter into every architectural enterprise, though in other ways, and with all the care in the world would not produce a church that would be a religious building in the highest sense. They refer to nothing which is essentially churchly or religious, but are pure matters of business, without any religious significance.

We have started to build a church; therefore, we must have more than pure matters of business with our architect. The building should have as great a religious significance, in its way, as the ceremonies that are practised there or the sermons that may be preached within it. Surely this is a plain and straightforward proposition, yet how often is it violated! Instead of religious feeling and sympathy, we have picturesqueness and variety; instead of religious art we have forms that may be employed in all sorts of buildings, and which only seem to belong to a church because our previous experience shows them to have been sometimes employed in such buildings.

BARR FERREE.

[To be continued.]

A SYLLABUS OF EARLY CHRISTIAN, ROMANESQUE AND GOTHIC ARCHITECTURE.[1] — V.

THERE is one structure which — although concentric — stands at the beginning of the whole period, namely, the imperial chapel Charlemagne built at his palace at Aix (Aachen). As the first structure of this sort and one of the oldest belonging to the early period of Romanesque architecture, it deserves to be mentioned separately here without regard to the later concentric structures which by no means exercise an equal influence. (See below.)

A. II. — THE NON-BASILICAL STRUCTURE.

The attempt to vault aims either (*a*) at a perfection of the basilical type, or (*b*) at the creation of a type that could be substituted for the basilica.

The former belongs to the Occident in general, but suffers from great interruptions and advances only slowly.

The latter is mostly limited to *Southern France* and realizes its aim at once.

The *single-aisled* tunnel-vaulted structures are probably the older.

PROVENCE.

St. Gabriel at Arles, 1100.
Church at Cavaillon, eleventh century.
Cathedral at Orange, twelfth century. [Neither has transept. Inside buttresses. Dome over square.]
Church at Le Thor, twelfth century. [No transept. Cross-vaulted nave. Dome.]
St. Martin at Londres, eleventh century. [Triapsal choir.]
Ste. Maguelonne, twelfth century. [Transept. Subsidiary choirs.]
Church at Montmajour, twelfth century.

LANGUEDOC.

St. Jaques at Beziers, eleventh and twelfth centuries. [Inside buttresses pierced so as to produce aisles.]

AQUITANIA.

Church at Layrac, end of eleventh century.
Church at Montmoreau, twelfth century.

ANJOU.

Church at Saumur, end of eleventh century.

The following single-aisled structures are vaulted with domes:

AQUITANIA.

Cathedral at Cahors, 1100. [Hemispherical dome. Apsidioles.]
Abbey Church at Solignac, consecrated 1143. [Pointed dome.]
Abbey Church at Souillac, twelfth century. [Pointed dome.]
Cathedral at Angouleme, 1101-1119. [Hemispherical dome. Cupolas over arms of transept.]
St. Front at Perigueux. [Exceptional. Greek cross. Pointed dome. History: Oldest structure erected during 976-991; consecrated, 1047. 1077; fire, 1122. New structure. Restored, 1865.]

POITOU.

Abbey Church at Fontevrault, twelfth century. [Choir with passage and chapels. Cupola elliptical.]

[1] Continued from No. 1031, page 136.

Dome combined with ribs:

ANJOU.

St. Trinite at Angers, twelfth century. [Peculiar shape of transept.]
Cathedral at Angers, 1030. 1150. [Latin cross.]

Basilica (exceptional).

LANGUEDOC.

Notre Dame at Le Puy, eleventh century. [Row of domes over nave. Aisles cross-vaulted.]

POITOU.

St. Hilaire at Poitiers. [Vaulted during end of eleventh or beginning of twelfth centuries. Seven aisles. Double-aisled transept. Choir with passage and chapels.]

The following churches have aisles of the same height and tunnel-vaults.

I. *Without galleries.*

a. Parallel tunnel-vaults:

St. Martin d'Ainay (Lyonnais), 954. [Restoration. Consecrated 1106-1113. No vertical memberment.]
St. Nazaire at Carcassonne (Languedoc), eleventh century, western part only. [Pointed vault in nave.]

b. Semi-tunnels over aisles:

Church at Preuilly, twelfth century.
Church at Parthenay-Vieux, twelfth century.
Church at Fontfroide, twelfth century. [Pointed tunnels in nave.]
Church at Silvacanne, twelfth century.

c. Cross-vaulted aisles:

Abbey Church St. Savin at Poitiers, eleventh century.
Notre Dame la Grande at Poitiers, beg. of eleventh century.
Church at Moirax, end of eleventh century. [Pointed vault in nave.]
Exception: **Cathedral at Poitiers, 1161.** [Angevin dome.]

II. *With galleries (semi-tunnels). Aisles cross-vaulted:*

AUVERGNE.

Notre Dame du Port at Clermont-Ferrand, eleventh and twelfth centuries.
St. Paul at Issoire, twelfth century.
Abbey Church at Conques, eleventh century.
St. Sernin at Toulouse, eleventh and twelfth centuries. [Five aisles.]

All the churches have choirs with passage and radial chapels.

Churches of this kind outside of France:

SPAIN.

S. Jago de Compostella, twelfth century. [Usually considered an imitation of S. Sernin.]

ITALY.

S. Ambrogio at Milan. [Oldest structure ninth century. Vaulted during eleventh century.]

GERMANY.

Chapel of St. Bartholomew at Paderborn, 1017.

THE TUNNEL-VAULTED BASILICA.

Group I.

St. Etienne at Nevers, 1063-1099. [Radial chapels.]
St. Guilhem en desert, eleventh century.
Cathedral at Vaison, beginning of twelfth century.
St. Trophime at Arles, eleventh and twelfth centuries.
St. Paul trois Chateaux, twelfth century.
Church La Garde Adhemar, twelfth century (?). [Peculiar form.]
All with subsidiary choirs.

Group II. — The home of this is chiefly Burgundy; its chief monument is:

The Abbey Church at Cluny. Founded 910. [Second structure, basilica with horizontal ceiling, columns and subsidiary choirs, consecrated 981. See *American Architect* for Sept. 28, '95. Third structure, 1089-1131. Five aisles, two transepts. Radial chapels. Apsidioles.]
St. Philibert at Tournus, first half of eleventh century. [Radial chapels.]
Church Paray le Monial, twelfth century.
La Charite sur Loire, twelfth century. [Subsidiary choirs.]
Cathedral at Autun, consecrated 1148. [Subsidiary choirs.]
Notre Dame at Beaune, twelfth century. [Radial chapels.]

A. III. — THE CROSS-VAULTED BASILICA.

This vaulting occurs almost simultaneously in the provinces of Central and Western France, Normandy, Lombardy, and the Rhenish provinces.

Two groups of buildings: one with alternation of supports (the division of the nave into full squares not always adhered to), and often sexpartite vaulting; the other with no alternation, rectangular compartments and quadripartite vaults.

Burgundy:

Cathedral at Langres, last third of twelfth century. [Quadripartite vaults.]
Abbey Church at Vezelay. Nave, after 1120. Choir, thirteenth century.
Vestibule of the same, after 1132.
Vestibule of Cluny, 1220.

Western France:

St. Aignan near Blois. Choir, eleventh century. Nave, twelfth century. [Quadripartite vaults.]
Cathedral at Le Mans, 1085-1077. Second structure consecrated 1158. [Quadripartite vaulting, but with grouping of supports.]

Influenced by these Western Provinces is:

Spain (the monuments influenced by Angevin vaulting. Peculiar

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arrangement of choir, situated in the nave while the congregation gathers in the aisles).

Old Cathedral at Salamanca, twelfth century.

Palestine:

Church of Holy Sepulchre at Jerusalem, 1149. [Transept and choir added to original building.]

Normandy:

St. Trinite at Caen, vaulted twelfth century.
St. Etienne, twelfth century.

England:

Cathedral of Durham, vaulted thirteenth century.

DOMAIN ROYAL AND PICARDIE.

The peculiar position of this province. The rapid change of the whole architecture into a new system: Gothic.

Collegiate Church at Poissy. [Only the choir and one bay of the nave, 1130–1135.]

PERIOD OF TRANSITION.

St. Martin des Champs at Paris. Choir, twelfth century.
St. Germer at Beauvais, begun 1132.
St. Maclou at Pontoise. Lower part of choir and transept, twelfth century.
St. Julien le Pauvre at Paris. Choir twelfth century, and a number of smaller edifices.

Northern Italy. — With galleries:

S. Michele at Pavia, about 1100. [Alternation.]
Cathedral at Parma, consecrated 1106.
Cathedral at Piacenza, begun 1122.
Cathedral at Cremona. Nave, twelfth century. Transept, thirteenth century.

Without galleries:

Chiaravalle near Milan, consecrated second half of twelfth century.
S. Savino at Piacenza, end of twelfth century.
Cathedral at Trient, begun after 1212.

Alpine Provinces:

Minster at Zurich, 1104–1289. [Irregular plan. Alternation.]
Minster at Basle. Nave begun 1185.

Germany:

Cathedral at Mainz. [History: 778–1056, horizontal ceiling; 1081 (?)–1137 (?), vaulted; re-vaulted shortly before 1200; 1200–1243, double apses.]
Cathedral at Speyer. [History: 1030–1060, horizontal nave, perhaps vaulted aisles; 1080–1100, the whole building vaulted; some addition, and the building finished 1200.]
Abbey Church at Laach, 1093–1156. [Double apses.]
Abbey Church at Eberbach, 1150–1156.
Cathedral at Worms. [Horizontally ceiled, 996–1016 (?); vaulted, 1171–81; double apses.]

B. — CONCENTRIC BUILDINGS.

Group I. — *Circular or polygonal shape.*

In *Germany:*

Imperial Chapel at Aix (Aachen), 796–804.

Imitated in:

Western choir of Minster at Essen. [Founded, 874. Rebuilt after fire in 947.]
Church at Ottmarsheim, eleventh century.
St. Michael at Fulda, 820–822. [Chapel.]

Another copy of more general order in *France:*

St. Germigny des Pres, 806.

Sepulchral chapels are not used after the end of eleventh century.

In *Italy*, Baptisteries at:

Florence, eleventh century.
Cremona, twelfth century.
Parma, twelfth century.
Pisa, twelfth century.

In *France:*

St. Benigne at Dijon, begun 1001.

and Templar-Churches.

Group II. — *Greek Cross.*

Italy:

S. Marco at Venice. [Oldest structure a basilica, ninth century. New building, 1043.]

Exceptional:

S. Antonio at Padua, 1232-1307. [Latin cross. Choir with radial chapels.]

Germany:

Chapel at Schwarz-Rheindorf, 1151.

THE HIGHER DEVELOPMENT OF THE ROMANESQUE STYLE IN GERMANY. — THE SO-CALLED "PERIOD OF TRANSITION."

The name transition is not adequate. Elements of Gothic, such as a system of ribs, the pointed arch and buttresses, are infused but not to the transformation, only to the enrichment of the style. The decorative purpose of these parts is generally more predominant than the constructive. The Romanesque features: the predominance of wall-space, the thickness of the walls, the squareness and quadripartition of the bays remain the same. The use of the pointed arch is merely a change that has no important consequences and the system of buttresses is used as little as possible. Instead of the visible flying-buttress, the German builders prefer the interior galleries, the roof of which performs the service of a continuous buttress, but unperceived. Thus the main lines of the building remain unchanged.

MONUMENTS.

Group I. — *Three conchs consisting of the apse and the arms of the transept.* Combination of concentric plan with the basilica.

St. Mary in Capitol at Cologne. [Old concentric structure (?).]
Church of the Apostles at Cologne.
Great St. Martin at Cologne.
Both twelfth century.

This triapsal system imitated in numerous edifices, *e. g.*

The Western Choir in Cathedral at Mainz, 1200.

Group II. — *French influence.*

Choir in Cathedral at Magdeburg, thirteenth century. [Soissons?]
Cathedral at Halberstadt, thirteenth century.
Collegiate Church at Limburg on the Lahn, 1235. [Ground-plan, German. Elevation, French. Laon.]
and others.

Parts of:

Cathedral at Strassburg, 1015-1028, thirteenth century. [Choir and transept.]
Minster at Freiburg in Breisgau, thirteenth century. [Nave and transept.]
Cathedral at Bamberg, 1004–1012, reconstruction, thirteenth century.
Cathedral at Naumburg, 1242. [Nave and transept.]
St. Sebaldus at Nuremberg, thirteenth century,
and others.

CISTERCIAN ARCHITECTURE.

[The cloister Citeaux, founded 1098, flourished especially during the twelfth century: 1800 filial cloisters founded in the course of 150 years.]

The cloisters of the Cistercian order are most remarkable for their application of Gothic principles in their churches, even before the Gothic *i. e.*, as it comes to be established by the architects of the Domain Royal.

The peculiarity of the order is the great simplicity of their churches, no towers, no decoration. The choir has a square ending with chapels along the aisles and on the east side of the transept. Great extension of naves.

The famous cloisters were destroyed during eighteenth century.

In *France* remain only:

Cloister Vaux de Cernay, near Paris, begun 1128.
Cloister Fontenay, in Burgundy, twelfth century.

In *Italy:*

Cloister Chiaravalle, near Milan, 1134.
Cloister Fossanova, 1135.

In *Germany:*

Cloister at Maulbronn, 1178.
Cloister at Heisterbach, 1202–1233.
Cloister at Riddagshausen, thirteenth century.

ÆSTHETIC ASPECT OF ROMANESQUE ARCHITECTURE.

While the Early Christian ideal was the decoration of the interior, Romanesque style pays attention to the exterior as well. The memberment of the vaulted structure is to a certain extent decorative in itself, and in some cases even the harmonious proportions of the structure possess a solemnity and beauty unnecessary to heighten by any decorative details. In most instances, however, only the ornament offers the means of softening the severity of the architectural lines and drawing the eye to pleasing effects.

A point of great æsthetic interest is the effective grouping of the main parts of the building. In this respect the vaulted structure is far superior — one of the main laws of the stability being the subordination of each part into order and regularity. The ideas of the concentric structure have been influential not only in suggesting the use of the vaulting, but have also powerfully affected the sense for composition and the centralization of effect that makes itself felt in the Romanesque church (not merely the basilica) in its most perfect form.

Even in early Romanesque architecture, the establishment of a central square from which all parts radiate and the greater regularity of the cross may be characterized as an attempt to reach a higher orderliness such as is so admirably displayed in the concentric form. As the style advanced this principle was worked out with clearer conception of its æsthetic advantages, and that grouping of parts and members in the interior and exterior which makes the Romanesque structure such an improvement upon the horizontally ceiled Christian basilica can be said to be only the conclusion necessarily brought about as soon as the leading thought has revealed itself.

In regard to the nave, the different methods of vaulting change its appearance according as the tunnel-vault, the cross-vault or the dome is used. The first produces a singular impression of continuity, while the groined vault makes the building more an organism composed of units. The idea of organism is least prominent and the separate units more pronounced in the structures where each compartment is covered by a dome. Even in the exterior this row of separate cupolas gives an idea of separateness rather than entity. Otherwise the system of vaulting in the exterior nowhere interferes with the impression of totality, the transept, the naves as well as the choir group themselves on the sides of the central square, which is in some cases even pointed out in the exterior by a more or less conspicuous tower. On the outside the main outlines of the building impress themselves distinctly upon the mind, and the verticalness of

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towers and domes contrasts pleasantly with the horizontality of the roof and the walls.

The choir is mostly treated so as to increase the conspicuousness of this sacred part and the transept often partakes of the significance applied to the choir. In the exterior — especially in large structures — it is sometimes marked out by special entrances and towers as having almost rank with the nave, while the latter is distinguished by a much more impressive façade, massive towers, a sumptuous entrance, rose-window and other decorative features.

The columns are still in use. The capital and base are heavy and the shaft generally short and even stout. The pier is by far the more common support because of its greater efficiency; it is either square or round and much improved by different modes of memberment added to increase its constructive and artistic value.

The variety and richness of Romanesque style is no less peculiar in its use of decoration. The freedom of invention and personal and national preference causes it to be one of the most original and interesting styles on earth. The presence of previous architecture, such as the Roman, is not without influence, however, and in the provinces of Southern France and Central Italy the reminiscences, coupled with the natural inclination of the people, created a style that is not inadequately termed Proto-Renaissance. In the North the lack of such models favors a strong expression of individuality, in which power and heaviness of proportion unite with picturesqueness and richness of design. In provinces where the old Celtic population still had some importance a fantastic and imaginary element is added.

Carvings of capitals, mouldings, frames of doorways and windows are abundant. The whole shaft of a column will sometimes be covered with sculptured ornaments, and yet in a whole row of supports of the same height no two capitals will bear the same design.

As for other kinds of decoration, the walls are often to a certain height coated with slabs of different color. In Italy this method is preferred to any other. The marmorarii. Another mode is that of painting. The capitals, mouldings, even the statuary, as well as the walls and the ceiling, are heightened in their effect by color. In the windows colored glass is not uncommon, especially in the choir and in the rose-window of the façade. M. Wergeland.

[To be continued.]

LEONARDO DA VINCI.[1]



After a Drawing in the Louvre, by Leonardo da Vinci.

In 1495 there were, if accounts may be believed, many beautiful girls in Florence. Two especially were talked about, one being Ginevra Benci and the other Mona Lisa Gherardini. The latter is known to all the world from her portrait entitled "La Joconde," which hangs in the Louvre, at Paris. It is a mysterious face, full of beauty, the eyes being deep and piercing, the mouth delicate but mocking, the skin clear and natural, the hands perfect, the bust ample, beneath a garment severely plain, the hair simply caught back and smoothed down over the temples, while on the ivory brow there is a secret *morbidezza*, a troubling voluptuousness that attracts, spurns and holds in thrall. Mona Lisa became the Florentine banker's third wife. When he married her he was no longer a young man.

About the year 1499, the most famous painter of the day was a certain Leonardo, the bastard son of a notary of the Signory at Florence and a peasant girl from the neighborhood of Empoli, named Catarina. Of this daughter of the soil we know nothing more. She must have been a superb creature, a descendant of the old Etruscan race — that is to say, a people whose Pelasgic blood had become intermingled with Gallic blood, and who built great walls which archæologists have styled Cyclopean to give an idea of their strength. We may suppose that this girl held some humble position in the notary's house, for her son was born in the da Vinci mansion itself. If the word "mansion" appears too grand, one can substitute that of *casa*, which is still used in those parts to convey the notion of a large and sumptuous dwelling. Not much is said of the father, yet it must not be imagined that the office of notary, or, to use a better word, secretary of the "Signoria," was as modest as has been stated. Ser Piero da Vinci was not a person of no importance. He belonged to the upper middle-class, if not to the aristocracy. The land which he owned near Empoli, in the most fertile part of Tuscany, the way in which he had his son educated, and the care he took to keep Leonardo near him in his town-house, show that his style of living was not at all poor, and that he was in easy circumstances. Nor could he have been a fool; for, in order to maintain his position amid the struggles of parties and the frequent upheavals in the city, he must have displayed considerable suppleness and ability. The facts that he knew how to bring up his son, and that his son was a man of genius, render it all the easier for us to rehabilitate his memory, which has been kept somewhat in the shade by Vasari. Admitting that Leonardo inherited from his mother that physical strength which was the admiration of his contemporaries, and of which historians have told us, nothing forbids us to think that he owed to his father at least a part of that ingenious spirit, that gentleness of character, and that gaiety which gave a stamp of originality to this incomparable artist, this clever and fruitful inventor.

Perhaps to him, also, Leonardo owed his taste for and his sense of art. Ser Piero da Vinci occupied an important position in a city which, more than a century before, had, by a vigorous effort, broken its Byzantine bonds. A new sap, prepared by the incubation of Christian ideas amid antique surroundings, had ascended and thrown forth new foliage and new fruits. Since the day when the Florentines had carried Cimabue's "Madonna" in triumph, Giotto had cut the last threads that bound the Middle Ages to the Greek Decline. A powerful school had arisen. People were living in an atmosphere that allowed no form of intelligence to remain inactive. Piero da Vinci would have been an extraordinary man if he had not, like all his compatriots, felt the influence of his environment. Little as is the notice taken of him by historians, they have recorded his associations with the great artists of his time, and especially with Andrea Verrocchio, painter, sculptor and architect, who, at that moment, held a foremost place in Florentine art. Michael Angelo was only just born. Botticelli alone could have equalled him in renown, but his whole thoughts were concentrated upon painting at a period when every artist worthy of the name made a point of cultivating all the fine arts. Although a possessor of broad and lofty ideas, Sandro Botticelli was not a producer of great works, most of his paintings being easel-pieces. A fervid disciple of Savonarola, he incurred the disfavor of the Athenians of Florence. The praise accorded to him in recent times comes very late in the day. In spite of a graceful style, his art, elegant as it is, has not that incontestable merit which makes a school. Verrocchio, then, reigned supreme, and he had the knowledge, the energy and the tact necessary to insure the retention of a position once gained.

Verrocchio, as stated, was a friend of Ser Piero da Vinci. The latter, justly appreciating his son's precocious inclination for science and art, had not left his faculties uncultivated. Leonardo was already a mathematician of great skill, a clever musician and a graceful horseman. Drawing, however, attracted him more than aught else. He dropped science and took up the pencil. He delighted in the most peculiar combinations, with eccentric figures and faces. His father was struck by them and showed these early efforts to his friend, Verrocchio, who saw at once in these strange images the signs of budding talent, and at his request the boy was confided to his care.

At Verrocchio's, all sorts of work was done — jewelry, gold and silversmith's work, and, above all, painting. Leonardo applied himself to all these crafts. He made rapid progress in every branch of art, so much so that one day, having painted an angel in one of his master's pictures, the "Baptism of Christ," which is now in the Academy of Florence, he proved himself so superior to his teacher that the latter cast aside his brushes and abandoned painting forever. Art lost nothing thereby; for Vorrocchio, without rising to the height of his rivals Ghiberti and Donatello, has produced sculptures of the first order, one of the most remarkable being his equestrian statue of the condottiere Coleone, which so admirably adorns the Piazza San Zanipolo, at Venice. . . .

In order to form a just and definite idea of the versatility of this powerful genius, one must read the letter which he wrote to the bastard Sforza, Ludovic the Moor, ruler of Milan. In this curious epistle, the original of which is religiously preserved in the Ambrosian Library, and which was published by Amoretti, Leonardo, who had, it is true, attained a great reputation by his "Madonna among the Rocks," of which both the Louvre and the House of Suffolk claim the original, and by his "Adoration of the Magi," now in the Uffizi Gallery, does not shine by his modesty. According to his account, he has invented all kinds of things, and painting is only one of his minor occupations. He has, says he, a way of making very light bridges, easy to transport, and by means of which a general can either pursue or avoid the enemy. He is able to render them incombustible, and undertakes to burn those of the rival army. He knows how to cut off the water-supply of a besieged city, and to place ladders in such a manner as to make it possible to enter a fortress which bombs could not reach. He possesses the secret of making portable siege-guns for showering a tempest of shot and frightening the enemy by their smoke. He has a scheme for opening parallels, so as to approach the walls by covered roads. He is prepared to construct armored chariots, proof against shot and

[1] Extracts from a paper in the *Nineteenth Century*, by M. Alphonse de Calonne.

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shell, to convey infantry right into the opposing ranks. His artillery is of a new type, comprising *ballistas* and catapults of prodigious power. He has even invented an iron-clad ship. "In case of sea fighting, I can employ many means of offence and defence, among others, bomb-proof ships; and I can manufacture powder and smoke." Here, if I mistake not, we have the modern ironclad and the melinite shell.

The great painter is not less expert in the arts of peace. Without fear of comparison with anybody, he can fill the office of architect and engineer, erect buildings, public and private, excavate canals and distribute water. We have a proof of this in the Martesana Canal. As to sculpture, he is able to model in clay, chisel marble and make casts in bronze. "I am ready" — this is the capital point — "to execute the bronze equestrian statue that is to be erected to the immortal glory and happy memory of your honorable father and the noble Sforza family." Of his profession of painter he makes scarcely any mention. "In regard to painting, I can do whatever may be required quite as well as anybody." After which, he adds: "and if anything stated above appears impossible of execution, I undertake to make the attempt in your park, or in such other place as may please your Excellency, at whose disposal I place myself."

This letter was written about 1480 or 1482, and its author must then have been between twenty-eight and thirty years of age. . . .

Leonardo's letter was apparently not displeasing to Ludovic the Moor, for the writer was at once summoned to the ducal Court to give a proof of his talents. He presented himself there in an original manner, as a poet and musician, carrying in his hand a lyre with the figure of a horse's head chiselled in silver by himself. This strange sight put Duke Sforza in a good humor, and conquered the sympathies of the ladies, towards whom Leonardo ever showed himself faithful and gallant. His wit, the vivacity of his conversation, the elegance of his manners, and the loyalty and tact displayed in his intercourse with the best society of Milan, gained for him during his stay in that city a great reputation as a man of the world while his works placed him in the front rank of famous Italian artists.

He produced some masterpieces, among them being the large fresco in the refectory of Santa Maria delle Grazie, portraits, easel-pieces, studies for the Martesana Canal, and the statue of Francis Sforza. His opinion was asked for in the conflict which arose between the German architects and their Italian colleagues touching the completion of Milan Cathedral. He was the arbiter of taste, and



Studies of Leonardo da Vinci for the Statue of Francesco Sforza: from the Collection of the Queen of England.

the organizer of festivities. Had the Olympian games been still in existence, he would have figured as an athlete; for with his hands he could twist the clapper of a bell, and, like Hercules, would have strangled the Nemean lion. He labored for nine years at the equestrian statue of Francis Sforza. He made two models thereof, but it is not known whether it was ever cast in bronze. Leonardo's friend, Luca Pacioli, the mathematician, declares that it was, and even gives its weight (200,000 lbs.) and height (12 Milanese fathoms, or nearly 23 ft.); but no other writer of the time mentions it, which is a matter of astonishment to recent historians of Leonardo. On the other hand, tradition has it that the second model, the one which was to have been perpetuated in bronze, was destroyed by the Gascon cross-bowmen when Louis the Twelfth captured Milan. This tradition must be erroneous, as a letter of Hercule d'Este states that it still existed there in 1501. It is, at all events, unlikely that a mass of bronze weighing 200,000 lbs. could have fallen to pieces without causing some stir in the world.

During his nine years' sojourn at Milan, Leonardo da Vinci executed many other works of various kinds. He painted the Duke of Milan's legitimate family, as well as the pretty women of his left-handed *liaisons*, and he painted them with his left hand, with which he also wrote. He founded there an Academy of Fine Arts, of which he seems to have been the sole professor. He wrote a treatise on "Lights and Shades," which latter-day artists might consult with profit. There is even ground to believe that it was at Milan that he painted the "Madonna among the Rocks." For two years he directed the work on the Cathedral. Finally, he took in hand the decoration of the refectory of Santa Maria delle Grazie, of which he only executed, however, the "Last Supper." The vestiges of this fresco are now scarcely visible.

This marvellous amount of labor, while leaving Leonardo's love of pleasure unweakened, failed to furnish him with the means to indulge it to the extent he wished, for the Duke was a poor payer and a slow one. Affairs at Milan became unsettled. Louis the Twelfth, arms in hand, claimed the succession of Valentine. So Leonardo, who was spending much and earning very little, returned to Florence, the wealthiest city of Italy after Venice. Here, orders flowed in rapidly. He acquired the habit of executing them when he felt inclined, or not executing them at all.

One day, Francesco Giocondo went to see Leonardo, and asked him to paint his wife's portrait. The artist stated his terms. "We shall want a dozen violin players to keep the sitter in a bright humor. If you like, we will add some singers and a few buffoons, so as to vary the monotony of the instruments. As there is not room for so many people in my modest quarters, we will hold our sittings at the Giocondo palace, where the apartments are spacious and richly decorated."

Signor Giocondo, who was generous, as every Florentine had to be in those days, readily accepted these conditions, and, after a preliminary study of the model, Leonardo began his task. . . .

But it did not happen thus, for the portrait had hardly been begun when the sittings were suspended. It might be supposed that Leonardo's restless genius, ever in search of a new inspiration, and eager for great enterprises, had fathomed the mystery before him and had found it an empty mockery — that, instead of the ardent spirit whose existence he had suspected, he had discovered merely a heart of ice. This supposition, however, is contradicted by the facts. The inventor of the architonitro-cannon retired for a time, but soon returned.

History does not say who made the first step towards resuming the painting of the portrait. I incline to the opinion that it was Mona Lisa. Leonardo was absorbed in his maritime canal from Florence to Pisa. He had an important work to execute at the old palace in conjunction with Michael Angelo. He was also putting the finishing touches to the portrait of the beautiful Ginevra Benci. His journeys in Umbria and Romagna interfered with his painting, and many works in progress were left unfinished. If he took four years, as is asserted by Vasari, to paint the portrait of the woman dear to his palette and to his heart, it must be admitted that the sittings were often suspended. Knowing the character of the man, we think it unlikely that he ever went to the Casa Giocondo to inquire about their resumption.

The fair Mona Lisa wanted to have her portrait painted by the hand of the great artist, but must have desired still more ardently to possess the artist himself. She seems to have taken the right road to go down to posterity. Dominate the painter, so penetrate his thoughts as to make them hers, engrave her image ineffaceably upon his memory — such, undoubtedly, was the object of this mysterious creature. Here are proofs of this. In spite of the fact that it was in hand for four years, the portrait is unfinished. It can be seen in the Louvre. Certain parts — accessories, it is true — are merely outlined. Yet the painter had abundant time to finish it, for he made several copies of it, which are done in such a manner that it is difficult to believe that they were painted to the sound of music and in Signor Giocondo's house.

From the time when he had the singularly typical visage of Mona Lisa for a subject, he never introduced any other face in his pictures for any feminine figure of importance. The "St. Anne" in the Louvre is a "Joconde" satisfied and without mystery. The "St. John the Baptist," also in the Louvre, is not a saint at all, either male or female, but a graceful image of Voluptuousness — a "Joconde" *sans arrière-pensée*.

There are "Jocondes" all over Europe, at London, Munich, Madrid, Rome and Florence, and — if it has not passed the frontier recently — another can be seen at the Villa Sommariva, Como. Finally, there exist two other portraits (half-length) of the beautiful Florentine. One of these was contained in Cardinal Fesch's collection, while the other is in the Hermitage Museum at St. Petersburg. Both are nude

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figures and it is scarcely probable that they were painted under the eyes of the husband; that they were executed with the lady's consent is a question open to examination. . . .

When Leonardo da Vinci came to France, he brought with him two portraits, of which he speaks in his letter to Charles d'Amboise, governor of Milan for King François Premier. One of these portraits is that of the "Joconde," and the other that of Lucrezia Crivelli, one of Duke Ludovic's mistresses. "I shall take with me," he says in his letter, "two portraits of different sizes, representing two of our ladies which I have painted for the king." . . . Until now, in fact, it has certainly been thought that Leonardo da Vinci painted Mona Lisa's portrait at the request of Ser Giocondo, her wealthy spouse. Everything confirms Vasari's statements as to the conditions imposed by Leonardo for the execution of his task — the choice of an apartment in the conjugal palace in which the fair model should sit to him, the musicians and buffoons to keep her in a good humor, and so forth. . . .

There is, however, another interpretation; but it might draw tempests upon the head of the rash person who dared to advance it. I, therefore, venture cautiously, and say in advance that I prefer to leave the little fiction upon Leonardo's conscience rather than encounter the disapprobation of the curators of the Louvre and the wrath of the whole body of French critics. If Leonardo painted the "Joconde" with a view of enriching the Royal collection, as he professes in his letter to De Chaumont (Charles d'Amboise), governor of Milan for the King of France, and negotiator of the master's visit to Fontainebleau, then we are at once forced to admit that the picture in the Louvre is not the original, but one of the copies made by the painter himself of the beloved visage. More than one critic inclines to this view.

Well, if it is a copy, it is worth the original, and there is no need, in my opinion, to squabble about its value, or about the painter's intention, or about the date of its execution: it deserves all that Vasari has said of the original. . . .

The "Joconde" in the Louvre is "a marvel, a work more divine than human." François Premier bought it of the painter for 45,000 livres, Tours currency — a sum exceeding 10,000*l.* sterling in these days — and it would be an ill-advised person who would assert that the French king, whose finances were at that moment very involved, showed too much generosity in the matter. Although the question of money is of little importance in determining the intrinsic value of a work of art, especially at a period when speculation has made art one of its sources of profit, it is worthy of remark that, if the "Joconde" were now for sale, the price would easily reach 50,000*l.* or higher.

We do not know whether the portrait of the beautiful Lucrezia Crivelli was paid for apart, or whether it was thrown in. There is no evidence upon the point. We only know that for a long time it passed in France as the portrait of the wife of the advocate, Féron, and was for that reason designated, even in catalogues, by the name of "la belle Féronnière." . . .

Leonardo had come to France to pass the rest of his days, bringing with him two portraits painted by him in his elaborate style. He always painted elaborately, without, however, losing any decorative effects. The reception which he met with at the French Court is familiar to everybody. At that period all eyes were turned towards Italy, where François I was disputing the German domination, and where the arts and sciences shone forth with such splendor as to dazzle the world. Leonardo was considered the greatest artist of his time, while his inventions, if they failed fully to realize his dreams, brought him, at all events, a brilliant reputation. Everything combined to make him a satisfied and happy man. Whence came, then, the melancholy that oppressed him, and which gave such a tone of sadness and regret to that letter of September 15, 1518? That letter was addresssed to a friend — doubtless a pupil — who was setting out for Italy. The identity of this friend is a matter of small importance: we have the letter, which is all we want. "My friend," wrote Leonardo, "you are starting for a country the memory of which is dear to me, and which art has made illustrious. Travel over it, and converse with the friends who have not yet forgotten me. You have letters for all of them, and they will not fail to aid you. They will make it their duty to assist you in your studies. Do not fear that you will weary them by your requests." Then the artist's thoughts, after having dwelt upon persons, turn to his works. He invites his friend to go and see them. Lastly, he speaks of himself. His heart is full of sadness; the recollection of his disappointments re-opens old wounds. "Pay no heed to the statements of a few ill-disposed men; form your own opinion of things, and you will be convinced of their injustice. You are aware, my friend, of what rivalry between artists can do. How many great men have been the butt of envious shafts? Enough, however; I am constantly reverting to my troubles. I wish to forget the injustices that have been done me."

Was it simply the injustice of which he had been the victim that drew from Leonardo this cry of pain? To believe so, we should have to overlook the fact that, of all the artists of his day, Leonardo was the most fortunate, the most lionized, and the one who gained renown the most quickly and with the least effort. He was also the richest, although he spent his money recklessly! And if he had cause to complain of Ludovic the Moor's tardiness in settling his accounts, it was because the duke was himself often short of funds before his treasury could be replenished. It must be remembered, too, that if certain persons were envious of the favors received by Leonardo, many of his contemporaries, both among artists and among the leading citizens of Florence and Milan, were, on the other hand, his warm friends. Take as an example that poor Sandro Botticelli, a charming painter, whose talent, infinitely graceful and refined as it was, never sufficed to support him. He died (1515) in poverty — a thing which our brilliant Leonardo never knew. . . .

Leonardo da Vinci died in France, at the Château de Clou, near Amboise, in the year 1519. As to what became of Mona Lisa nothing is known. But her name, like her beauty, remains immortal.

Numerous legends surround the name of Leonardo da Vinci. To dissipate all of them would require a volume; but there is one which I should like to dispel. It is to the effect that Leonardo died in the arms of King François Premier, and it has met with such acceptance in France as to be incorporated in certain histories, and even to be the subject of a painting. A large picture by Jean Gijoux, which was unwisely placed on view in the Paris Universal Exhibition of 1889, represents the king seated beside the bed on which the great master lies at the point of death. This picture has caused the legend to receive a still greater amount of credence. A few words, however, will suffice to disprove the story. As a matter of fact, at the moment when the painter of Mona Lisa passed away, François Premier was at the Château of Saint-Germain, near Paris, as is shown by the court journal. No document of the period makes any mention of the king having journeyed to Amboise at that particular time, and Melzi, Leonardo's friend and companion, does not allude thereto in his letters. The legend, therefore, is apocryphal, and historians would do well to treat it as such.



ARCHITECTURAL LEAGUE OF NEW YORK.

THE October meeting of the Architectural League was held at its rooms, 215 West 57th St., on Tuesday evening, October 1.

President Post, through an error in date, found it impossible to be present and, Vice-President Low being in Europe, Treasurer Warren R. Briggs acted as Chairman of the meeting.

There was a small attendance on account of its being the early autumn meeting, thirty-seven members being present and four guests, and after a dinner that all seemed to enjoy, Mr. Alfred R. Schlessinger read an admirable paper on "The Castles and Personal Qualities of King Ludwig II of Bavaria," which was very generously illustrated with stereopticon views. The paper was a very enjoyable one. Mr. Schlessinger discussed some very interesting points, both in regard to the architecture and extravagant expenditure of money, as well as the personal qualities of the character of the King himself.

Mr. Schlessinger seemed to be thoroughly acquainted with the history of the King and of many personages around him, as well as very familiar with the architecture and its many good qualities.

After the paper, Mr. J. Arthur Brand, a well-known English architect, of London, Eng., who has been a guest of the Seawanhaka Yacht Club, and the owner of the half-rater "*Spruce IV*," he himself personally directing the racing of his boat with the "*Ethelwynn*," was a guest, and, at the invitation of the League to address the Society, gave a good many interesting details of the progress of architecture in London, as well as many interesting details of the principal architectural buildings erected in London of late years.

Mr. Dankmar Adler, of Chicago, was present and gave a talk on the present building interests of Chicago, giving some idea of the effect the World's Fair had upon the city's buildings, and on request of Mr. Gibson, as to what effect the new law in Chicago, limiting the height of new buildings, had bad upon property, he spoke quite at length of the various changes the law had effected in property interests. He seemed to be thoroughly impressed that it had much reduced the income from the business property and believed that a great many old buildings of four stories or more, which, although in somewhat bad condition and much wanting the later improvements in equipment, would stand for years, if the laws stood, as they are. He found it impossible in estimating the values of such property to be able to show much of an increase on the investment by improving the property. After reports from the various officers and committees, the meeting adjourned.

GEO. KEISTER, *Secretary.*

SOCIETY OF BEAUX-ARTS ARCHITECTS. — YEAR 1895–1896.

THE Committee on Education of the Society of Beaux-Arts Architects has decided to hold four competitions for advance students (Class A), and four competitions for beginners (Class B), during the coming season. Each competition will last three months, and the programmes, Classes A and B, will be issued on October 1, 1895, January 1, April 1 and July 1, 1896.

Competition Class A will be open to all students having obtained a medal, or a First, Second or Third Mention in any of the competitions held during the past season, and to all students who shall have obtained one First Mention or two Second Mentions in the competitions held under programmes, Class B, during the coming season and all college students.

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Competition Class B will be open to all students of architecture who may apply for admission, provided that their application is endorsed by their professor.

The students in the Colleges of Architecture are specially invited to enter these competitions.

The competitions will be held under the direction of the Committee on Education, who will issue the programmes. The drawings submitted by the competitors will be exhibited publicly in this city at least two days before the judgment and at least three days after the judgment. The judgment will be rendered by a committee of not less than eight, nor more than ten, which will consist of the five members of the Committee on Education, and five other members specially invited to serve as a jury of award. The jury will classify the drawings in the order of merit, and will award First, Second and Third Mentions, respectively, to such drawings as may seem to them to deserve recognition. The jury will award for each competition under Class A one medal to the most meritorious drawing; it being, however, left to their discretion not to award a medal should none of the drawings prove deserving of such recognition.

Each student receiving a mention will be entitled to receive from the Society a certificate of award. The programmes for the different competitions, and any other information relating to the competitions, can be obtained from Mr. Albert L. Brockway, *Secretary of the Committee on Education.*

COMPETITION NO. 1. — PROGRAMME A.

The Committee on Education proposes as the subject for competition, "A Monumental Fountain."

The citizens of New York propose to erect a Monumental Fountain as a memorial to Peter Stuyvesant. The fountain is to form the end wall of a building to be erected on the land facing Madison Square, at the intersection of Broadway and Fifth Avenue with Twenty-third Street.

A statue of Peter Stuyvesant will form the central motive of the composition.

The building is to be six stories high, fifty feet wide. The angle of Fifth Avenue with Broadway is supposed to be forty-five degrees. The elevation to be on a plane at right angles to the bisectrix of the angle.

A sketch on tracing-paper of the plan and elevation at a scale of one-thirty-second of an inch to the foot will be required of all students intending to compete, and should be addressed on or before October 25th, to Mr. Albert L. Brockway, *Secretary*, 55 Broadway, New York City.

For the finished drawings there will be required a plan which will include the immediate surroundings, an elevation on Twenty-third Street, and a section; all at a scale of one-fourth of an inch to the foot, and a detail at a quarter the size of execution.

These drawings are to be rendered in water-color, mounted on stretchers, and forwarded on or before December 30, 1895, to W. S. Budworth & Son, 424 West 52d Street, New York City.

NEW YORK, N. Y., October 1, 1895.

NOTE. — This competition is restricted to students having obtained a medal, or First, Second or Third Mention in the competitions held during year 1894-1895, and to college students.

COMPETITION NO. 1. — PROGRAMME B.

The Committee on Education proposes as the subject for competition, "The Entrance to a Park."

A wealthy gentleman wishes to erect an imposing entrance to his country-seat. The composition is to include a small Gate Lodge to be occupied by the gardener and his family, and to be placed at one side of the entrance. A Covered Refuge for pedestrians will be placed at the other side.

The entrance proper will consist of a central drive and two entrances for pedestrians.

The buildings, gate posts and property enclosures to be of masonry. The gates to be of iron.

The distance between buildings will be fifty feet. The Lodge will not exceed 1,600 square feet of area under roof.

A sketch on tracing-paper of the plan and elevation at a scale of one-thirty-second of an inch to the foot will be required of all students intending to compete, and should be addressed on or before October 25th, to Mr. Albert L. Brockway, *Secretary*, 55 Broadway, New York City.

For the finished drawings there will be required a plan showing the entrance and buildings, and also the main road, drives, walls and a part of the property enclosures, at a scale of one-sixteenth of an inch to the foot; an elevation of the road-side of the entrance at a scale of one-fourth of an inch to the foot.

These drawings are to be rendered in water-color, mounted on stretchers, and forwarded on or before December 30, 1895, to W. S. Budworth & Son, 424 West 52d Street, New York City.

NEW YORK, N. Y., October 1, 1895.

NOTE. — This competition is open to all students of architecture. Conditions of judgment and jury to be arranged by the Committee.

JOHN M. CARRÈRE, *Chairman*,
ALBERT L. BROCKWAY, *Secretary*,
JOHN G. HOWARD,
WHITNEY WARREN,
E. L. MASQUERAY,
} *Committee on Education.*

AMERICAN INSTITUTE OF ARCHITECTS.

THE Twenty-ninth Annual Convention will be held at the St. Nicholas Hotel, St. Louis, on Tuesday, Wednesday and Thursday, October 15, 16 and 17, 1895.

ORDER OF PROCEEDINGS.

TUESDAY OCTOBER 15TH. — MORNING AND AFTERNOON SESSIONS.

MORNING, 10 A. M.

The members of the Institute will assemble in the banquet-hall of the hotel promptly at 10 o'clock; will register their names, and at 11, the President of the Institute, Mr. Daniel H. Burnham, of Chicago, will deliver the Annual Address, after which the Convention will be declared open for business.

ORDER OF BUSINESS.

1. Report of the Board of Directors.
2. Report of the Treasurer and appointment of the Auditing Committee.
3. Reports of Chapters, a synopsis of which will be read by the Secretary.
4. Reports of the Standing Committees — Committee on Foreign Correspondence, W. L. B. Jenney, *Chairman;* Committee on Education, Henry Van Brunt, *Chairman;* Committee on Publication and Library, W. L. B. Jenney, *Chairman;* Committee on Uniform Contract, S. A. Treat, *Chairman;* Committee on Conservation of Public Buildings, R. M. Upjohn, *Chairman;* Committee on Fire Protection, T. M. Clark, *Chairman.*
5. Consideration of the Annual Address of the President, of the report of the Board of Directors, and of the reports of the Chapters and Standing Committees, followed by the appointment of Special Committees to which recommendations contained therein shall be referred.
6. Report of Special Committee on the Proportionate Representation of Chapters in the Board of Directors, and consideration of the same, and of proposed amendments to the By-Laws.

It is proposed that the morning and afternoon sessions shall be continuous with the exception of a recess, during which the Convention will lunch at the St. Nicholas Hotel, as guests of the St. Louis Chapter.

EVENING, 8 P. M.

There will be a formal reception at the Museum of Fine-Arts to the Fellows of the Institute and their friends, as guests of the St. Louis Chapter, on the occasion of the opening of the Exhibition of the St. Louis Architectural Club, and an Address of Welcome by His Honor, Cyrus P. Walbridge, Mayor of St. Louis.

WEDNESDAY, OCTOBER 16.— MORNING SESSION, 10 A. M.

1. Reports of Special Committees and Committees appointed at the opening session.
2. Unfinished business of previous day.
3. Papers:

(*a*) "Professional Relations between Architects and Clients," N. C. Ricker, F. A. I. A., Professor of Architecture in the University of Illinois.

(*b*) "Coöperation *versus* Competition," Norman S. Patton, F. A. I. A., Chicago.

(*c*) "Suggestions for Increasing the Influence of the Institute among the Architects of the Southwest, and at the same time the Elevating of the Profession before the Public," James B. Cook, Ph. D., F. A. I. A, Memphis, Tenn.

4. Appointing of committees to nominate officers of the Institute for the ensuing year, and to suggest a place in which to hold the next annual convention.

The morning session will be followed, by invitation of the St. Louis Chapter, by a luncheon at the St. Nicholas Hotel, a carriage-drive in the afternoon through the residence portion of the city and the parks, and on the return drive a luncheon at the Columbian Club, or a steamboat excursion on the river.

EVENING SESSION, 8 P. M.

A Memorial Meeting to the memory of Ex-President Richard Morris Hunt, LL. D., F. A. I. A., Honorary Member R. I. B. A., etc., with a eulogy by Henry Van Brunt, F. A. I. A., of Kansas City, followed by George B. Post, Vice-President A. I. A., and others.

After this meeting is adjourned, the Fellows of the Institute are invited to a "Smoker," at the Mercantile Club, as guests of the St. Louis Chapter.

THURSDAY, OCTOBER 17.— MORNING SESSION.

1. Reports of Committees and their consideration.
2. Unfinished business.
3. Papers:

(*a*) "Prevention of Discoloration on Plaster applied to Fireproof Work and Damp Walls," L. de Coppet Berg, F. A. I. A., New York.

(*b*) "Woods of Washington Territory," George W. Bullard, F. A. I. A., Tacoma, Wash.

4. Election of officers, and selection of a place for the next annual convention.
5. Miscellaneous business.

The morning session will be followed, by invitation of the St. Louis Chapter, by a luncheon at the St. Nicholas Hotel.

AFTERNOON.

The afternoon will be reserved for a visit to the Anheuser-Busch Brewery; and the residue of the day, if any, or part of the following day, will be devoted by resident architects to showing visiting architects such buildings under construction and prominent buildings already erected, as the latter may desire to see.

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EVENING.

Visiting architects will be taken to the theatre or Exposition.

Prompt attendance on the successive sessions, at the hours indicated, is very particularly requested; otherwise, the business of the convention cannot be fully accomplished.

Committee of Arrangements:

George B. Post, Cass Gilbert, W. W. Clay, *From the A. I. A.*

A. F. Rosenheim, Charles K. Ramsey, Thomas C. Young, W. B. Ittner, E. A. Manny, *From the St. Louis Chapter.*

Per order of the Committee,
Alfred Stone, *Secretary A. I. A.*

THE SKETCH-CLUB OF NEW YORK.

The regular monthly meeting and dinner of the Sketch-Club of New York was held on Saturday evening, October 5th, at Lanteline's restaurant, West 33d Street, over forty members being present; Mr. Field, the President, presided.

After dinner the Club was addressed by Mr. Carl Bitter, the well-known sculptor, who gave some very interesting personal reminiscences of the late Richard M. Hunt. Mr. Bitter's very eloquent and sympathetic talk called forth much applause and he was unanimously voted the thanks of the Club.

Prof. A. D. F. Hamlin of Columbia College was also present as a guest of the Club, and he supplemented Mr. Bitter's remarks with other recollections of Mr. Hunt from his own experience.

Professor Hamlin was also voted the thanks of the Club and promised at some future date to entertain the Club with some account of his recent tour in Europe.

On behalf of Messrs. Klee Bros., Mr. Bitter presented the Club with a medallion portrait of Mr. Hunt.

A proposed amendment to the Constitution, raising the initiation fee to five dollars and the quarterly dues to three dollars, was passed by an almost unanimous vote. The object of this increase is to meet the expense of the new rooms on East 16th Street, between Broadway and Fifth Avenue, which the Club is about to take in connection with the Kit Kat Club.

Alfred F. Evans, *Recording Secretary.*

BOSTON ARCHITECTURAL CLUB.

The meeting and dinner of the Architectural Club on Monday last was, in a measure, complimentary to Mr. E. M. Wheelwright, the latest and last incumbent of the office of City Architect.

Mr. Wheelwright's response to the introduction by the President, Mr. Andrews, was an informal consideration of the subject under discussion.

He believes in the abolition of the City Architect's Department, since, under existing civic conditions, there was little possibility that a salary proportionate to the responsibility of the work or security of tenure would be given the City Architect.

If an architect resisted the interference of members of the Board of Aldermen in the business of the office, the aldermen would vote against his confirmation for a second yearly term. It was hardly to be expected that every mayor would, as Mayor Matthews did, retain such an unconfirmed official in office.

In many cases the City would benefit financially, now that the responsibility for building appropriations is thrown upon the departments for whose use the buildings are built, but the average mayor, while able to inform himself as to the character and professional standing of the architects nominated to him by the several departments, could not be expected to pass understandingly without professional advice upon the designs he was called upon to approve.

The mayor should, therefore, have the assistance of an official salaried architect as professional adviser, or better, that the approval of the Fine Arts Commission should be required for all designs for city buildings, this commission now controlling the design of all public fountains, statues, etc.

The speaker thought that in such matters the public needed "Representation of Cultivation."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF E. L. SHEPPARD, ESQ., WISSAHICKON HEIGHTS, PHILADELPHIA, PA. MESSRS. HAZELHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

[Heliochrome issued with the International and Imperial Editions only.]

UNION TRUST BUILDING, OLIVE AND 7TH STS., ST. LOUIS, MO. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

THE WAINWRIGHT BUILDING, CHESTNUT AND 7TH STS., ST. LOUIS, MO. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

DESIGN FOR A HOSPITAL. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

MONUMENT TO EMILE AUGIER, VALENCE, FRANCE. MME. LA DUCHESSE D'UZES, SCULPTOR; M. LOUIS PARENT, ARCHITECT.

[Copper-plate Etching.]

WHEN, some time ago, the town of Valence decided to erect a monument to its distinguished son, Emile Augier, among the competitors who submitted designs was the Duchesse d'Uzes, a lady who had contributed various sculptures to the *Salon* under the name of "Manuela," and who had won a *Mention Honorable* in 1887 with a figure of "St. Hubert," intended for the Church of the Sacré Cœur on Montmartre. The municipality selected the design of the Duchess, who is as generous as she is wealthy, and whose gratification at this honor was such that she offered to present the town with the monument and also to defray the cost of its pedestal and pay for the laying-out of a public square, with gardens and fountains, around the site of the monument.

She then sent the model of the work to the *Salon* of the Champs Elysées, whereupon the committee of selection promptly declined it, on the ground of its size (which was enormous), its alleged lack of merit, and the fact that though avowedly completed by the Duchess in six months, even a professional sculptor could not have modelled the figures, single-handed, in a year, and it was impossible, therefore, that the work could be entirely hers. This action of the jury caused quite a sensation, evoking many comments from the press and insinuations of professional jealousy and political motives, and a vigorous protest from the Duchess and the municipality of Valence, which had the effect of extorting permission from the authorities to exhibit the monument outside of the Palais de l'Industrie, which was accordingly done.

The noble author of this work is now said to be engaged on a colossal statue of the "Virgin," to be placed on a rocky mountain-peak on her estate.

FOUR COMPETITIVE DESIGNS FOR THE TOWN-HALL AT STUTTGART, WURTEMBERG. HERREN GEORG FRENTZEN; O. W. WARENBACH; BEISBARTH & FRÜH AND VOLLMER & JASSOY, ARCHITECTS.

These plates are copied from *Architektonische Rundschau.*

UNIVERSITY LIBRARY, LEIPSIC, SAXONY. PROF. ARNOLD ROSSBACH, ARCHITECT.

This plate is copied from *Zeitschrift für Bauwesen.*

SELECTED DESIGN FOR THE NORTH BRITISH RAILWAY HOTEL, EDINBURGH, SCOTLAND. MR. W. HAMILTON BEATTIE, ARCHITECT.

We reproduce after the *Building News* some of the drawings of this building which were exhibited at the Royal Academy last spring and subjoin a portion of the author's description.

In describing the design I shall deal first with the exterior. This is the simplest portion of the problem, but is the one in which the inhabitants of Edinburgh and the general public are most interested. The exterior may, I think, be designed in half-a-dozen different ways, and yet each of these be well suited to the situation, and command the approval of men of taste. I am of opinion, however, that any building to be a success here must be designed in one of the Classic styles. The whole surroundings demand this; the spirit of the architecture of the new town of Edinburgh, and of Princes Street in particular, being distinctly Classic, and, with the single exception of Sir Walter Scott's monument, departures from this Classic feeling have not been successes. At the same time I think that a commercial building like the present requires a freer and more picturesque treatment than the regular Classic of the Register House and of the General Post-office. I have, therefore, designed the exterior of the new building in a free treatment of the Renaissance style, and, by the angle pavilions and in the Princes Street tower, a Scotch feeling has been given to the leading details with a view of distinguishing this as a national building to be erected upon the most important site in the ancient capital in Scotland. This street and first-floor stories of the new building are designed with recessed arcades and projecting balconies. The upper stories are treated in a lighter and less powerful manner. The roofs and sky-line have been most carefully considered, and the picturesque and varied sky-line which such a building and site demand has been obtained by the artistic grouping of the dormer windows, chimney-stacks, gables and towers.

The six shops to North Bridge have been given the usual amount of plate-glass demanded by the modern shopkeeper, without detracting from the balanced and monumental character of the eastern elevation. The ceiling of the highest habitable room in the hotel is 90 feet above the level of Princes Street, being 5 feet lower than provided in the Act of Parliament. It may be noted here that the height of the street floor is 26 feet 6 inches, and of the first floors,

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above and below Princes Street respectively, 16 feet and 16 feet 6 inches. None of the bedroom floors are under 12 feet high.

The designing of a first-class hotel is a complicated problem. No hotel is well planned which does not thoughtfully provide for the comfort of its varied guests from the time they arrive until they depart. This, however, is but half the problem, as unless the building is also so planned that it is easy of management and supervision, and can be economically worked with the minimum staff, it is not likely to be commercially successful, and, without this, success in other departments is of little value. There is little difficulty in designing handsome public rooms, halls and staircases, but these are the mere A B C of hotel planning. The other matters of which I speak are vitally essential to the comfort of the guests, and to the commercial and administrative success of the hotel. The following are a few of the more important:

(1) The plan must be simple, with straight, well-lighted corridors, and easily and readily-found staircases and elevators. (2) The guest on arrival must be able at once to reach the office to procure his room, and to proceed there direct, without delay or detour, which are most aggravating to a tired traveller. (3) The hotel offices should command the principal entrances. (4) The public rooms should have the best views, and should be in such positions as are most convenient for the special class of guests who chiefly use them, and so as to cause the least interference with the other guests who do not use them. (5) The kitchen should be large, well-lighted and ventilated, and in a central position, from which rapid services may be made to every part of the hotel. (6) All the administrative apartments should cluster round the kitchen. (7) The working arrangements should be planned so that the hotel may be run with the minimum staff of servants. (8) The bedrooms should be of fair size, and varied in dimensions, so as to accommodate both married couples and single visitors. (9) On the principal floors there should be suites of sitting-rooms, bedrooms, dressing-rooms and bath-rooms, to meet the requirements and purses of wealthy travellers. (10) Careful provisions should be made for the rapid and efficient service upon each floor. (11) The measure of the earning power of a hotel is the bedroom accommodation, and the more numerous they are the better it will pay. (12) Everything connected with a hotel should, as far as possible, be done on the premises. (13) Every first-class railway hotel should do an extensive restaurant and bar business, (14) Every first-class hotel should do a wine and spirit merchant's business, and should have a special shop or office for conducting it. (15) The arrangements for the housing of the hotel servants should be carefully considered.

The site is nearly square, and the new building is designed along the four frontages, leaving an open court in the centre, size 74 feet by 70 feet. This will secure the ample lighting and ventilation of the internal rooms and staircases, a matter of great importance and which is most defective in the principal London hotels and clubs. The walls to the internal court will be faced with white enamelled brickwork.

The keynote of the design is the kitchen department, which has been placed exactly in the centre in the second flat below Princes Street, and occupies the floor of the internal court. This position gives equally quick and direct service to every part of the hotel and to the public restaurants. The kitchen department will have a close glass roof, and will be ventilated by extracting flues.

The principal public rooms occupy the west and north fronts on the level of Princes Street, and upon the first floors above and below that street. The public bars and restaurants occupy the north-east corner of the building upon the Princes-Street level, and also upon the first floor below. The North Bridge frontage is chiefly occupied by shops and by the principal entrance to the railway offices. The southern front is occupied by the railway offices, except on the fourth and fifth floors above North Bridge Street, and the third floor below that level, which are occupied as hotel bedrooms.

The following is an abstract of the accommodation of the building, sub-dividing it into public apartments, private parlors for visitors, visitors' bedrooms and dressing-rooms, hotel officers' and servants' sitting-rooms and bedrooms, stock-rooms and administrative apartments, which last will include every apartment not embraced under any of the previous heads: —

(1) Public apartments	21
(2) Private parlors for visitors	14
(3) Bedrooms and dressing-rooms for visitors and their servants	295
(4) Sitting-rooms and bedrooms for hotel officers and servants	146
(5) Stock-rooms	10
(6) Administrative apartments	262
Total	748

The lettable apartments, including private parlors, bedrooms and stock-rooms, number 819, and, as mentioned before, this is the measure of the earning power of the hotel, apart from the public bars and restaurants. A hotel with this accommodation will, when full, draw at least £2,000 per week, apart from the public bars and restaurants and the wine business. I have provided six shops fronting North Bridge Street, of which one will be occupied as the hotel wine shop. My opinion is that the whole building can be completed for occupation for the sum of £221,000.

BILLIARD-ROOM, "HALTON," HERTS, ENG.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents wi forget to give their names and addresses as guaranty of good faith nor do they hold themselves responsible for opinions expressed b their correspondents.*]

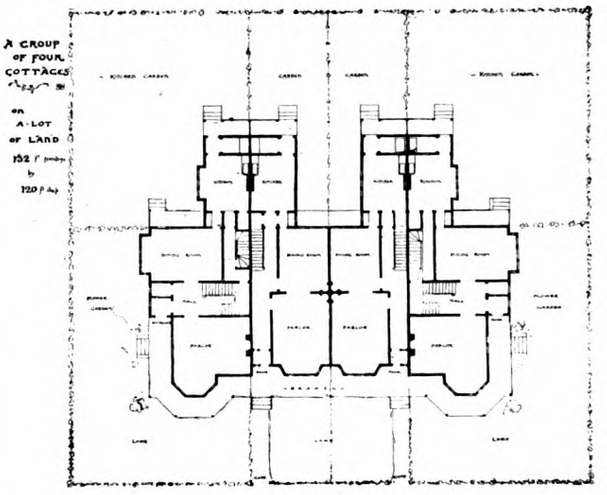
A GROUP OF FOUR COTTAGES.

BOSTON, MASS.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The other day, some one, writing from Roxbury in a letter to the *Transcript*, was lamenting the erection of tenement-houses in that neighborhood on land which was formerly old estates with pleasant surroundings.

Unfortunately, this kind of building is not confined to Roxbury district, for most of our suburban places are undergoing the same



change. The writer finishes by asking if nothing can be done. Well, the only thing that can be done at present is to try and create a distaste for these tenement-houses amongst the class of people who desire to live in them, and to create a taste for something more beautiful. As long as people moving from the city to the suburbs like to live in flats, the speculative builder will supply them. On



the outskirts of Dorchester, in some parts which are yet pure country, these hideous blocks, with flat tops and invisible roofs, are going up. They are blots on the landscape and rob us of what beauty Nature gives, as well as depreciate the value of the surrounding land, for no persons of wealth, with any taste or refinement, will want to live in such districts.

One argument brought forward in favor of these tenement-blocks is that by getting people to live in this way, one on the top of the other, much space is saved, where land is valuable. But what kind of living is it for any one in the country? There is little privacy for each family. Imagine, too, the inconvenience to a family with children, on the third or fourth floor, of getting the baby-carriage up



and down, or the family washing. All the garden these houses have consists of a few flower-boxes at the window: the rear yard is generally large enough to hold a clothes drying reel.

The single or double cottage on its bit of garden land, however small, is infinitely preferable to such flats. This arrangement can be carried out so as to form groups of four, five, or more cottages,

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each with its own strip of garden ground divided by hedges from the others — for division lines *are necessary*, but need not be *ugly*.

As far as the plans go, this group of four cottages is not given as a finality, but only to indicate how they may be grouped, to look picturesquely on the exterior.

The treatment of the exteriors is devoid of ornamentation, such as swags, festoons, and "compo" ornament, which we find on "high class" tenement-houses in the so-called "Colonial" style, gotten up to tempt the poor house-hunter. Yet, if the design of these cottages were still simpler on the exterior, I contend that with the aid of garden and grounds tastefully arranged, they would be pleasant places to live in, and in harmony with rural surroundings.

R. Brown, Jr.

STAND-PIPES AND ROOF HYDRANTS.

Boston, Mass., October 7, 1895.

To the Editors of the American Architect: —

Dear Sirs, — I note the remarks which you have made upon stand-pipes, roof-hydrants, etc., I also observe that property-owners and others in New York began to put up these appliances in consideration of a concession in the rates of premium granted by Underwriters. I also observe that when the Underwriters ceased to grant concessions the owners ceased to protect their property against loss by fire, so far as it might have been protected by this simple system of outside appliances at a very moderate cost.

The implication from your article is that the Underwriters are responsible for the neglect of owners to build safe buildings and also for the neglect of owners to take proper measures for preventing them from being destroyed after they have been erected.

The very plain reply to this imputation is that Underwriters have no control over the property — they cannot lay down rules of construction, or prescribe methods of protection. The owners and occupants are the only persons who can insure property against loss by fire in any true sense. In the nature of the case the sole function of the Underwriter is to enter into a contract to indemnify the owner or occupant for any loss that may occur.

I venture to put this plain question — Is the owner or occupant of a building who takes the question of safety from fire into consideration only with a view to securing a lower rate of premium on a contract of indemnity, in total disregard of his own responsibility for the protection of that property, a safe person with whom to enter into a contract of indemnity for loss at any rate of premium that can be named? I think not.

Heavy losses and destructive conflagration can neither be prevented by the Underwriters nor by City Fire Departments, so long as owners continue to put up fire-traps and neglect to protect them after they are put up — trying to evade building acts and grumbling about them when they are enforced.

High rates of premium on contracts of indemnity and heavy taxes for the support of Water Works and Fire Department must in the nature of things continue so long as the art of combustible architecture continues to be the common practice, and the neglect of simple safeguards the common rule.

The longer the owners of real estate in Boston wait for the Underwriters, the Water Board and the Fire Department to protect them from the consequences of their own neglect, the oftener will be the heavy losses and surer will be the recurrence of destructive conflagrations.

I deal with this question wholly as an observer and not as a party in interest. The Underwriters with whom I am associated take no risks in the crowded parts of cities. One reason is that there are very few buildings in any of the great cities which, if moved into the suburbs and there offered for insurance, would be safe for a Mutual Insurance Company to take at any rate of premium even as high as those now charged upon them in the midst of their dangerous surroundings, until fitted up by the owners with suitable pumps, pipes, hydrants and other appliances.

The fault with the Underwriters is not in their rates, which they are now attempting to adjust so as not to be compelled to give up their business, either in bankruptcy or by withdrawal. The fault lies with the owners who look to the Underwriters, the Water Board and the Fire Department to protect them from the consequences of their own incapacity to build safely and to guard properly against the hazard of fire.

Edward Atkinson.

EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opens October 14.

New York, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice," also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

St. Louis, Mo.— *Art Exhibition at the Exposition, including Special Collection of "Pictures of the Glasgow School."*

NOTES & CLIPPINGS

New Uses for Peat. — German chemists have been experimenting with Irish peat, and have secured such remarkable results that a syndicate has been formed for the manufacture, on a commercial scale, of the various products that may be obtained from Ireland's boglands. One of these products is an antiseptic "wool" for dressing wounds. It possesses absorbent qualities so great that it will soak up nine times its weight of moisture. The medical department of the French army has adopted this substitute for lint and 12,000 kilogrammes of it were sent with the expeditionary force to Madagascar. By a different process of chemical treatment the peat is formed into a material from which any article requiring hardness and durability can be produced. The German syndicate has now on exhibition in London, insulators, axle boxes, machinery bearings, gun stocks, piano-forte legs and numerous other things to illustrate the possibilities of this new material. Peat has been used in this country for lining refrigerators and cold-storage rooms, and to some extent as a covering for steam pipes, because of its value as a non-conductor of heat. But by these new German processes a wide field appears to have been opened, in which capital and labor may be profitably employed, and the Irish peat bogs acquire a value hitherto unknown. One of the largest beds of fine peat in this country underlies the Great Dismal Swamp of Virginia. If the experiments of the German chemists should ultimately result in a large utilization of Ireland's peat deposits, it will not be long before some American chemist determines whether Virginia peat can be treated in like manner and the same products be obtained. — *Worcester Spy.*

Long Island Names. — There seems good reason to believe that the barbarous proposition to change the name of Speonk to Remsenberg, because a wealthy person named Remsen was willing to contribute to the erection of a new church if the village should be rechristened in his honor, has fallen through. It is high time to call a halt to this practice. The topographical names of Long Island are not always euphonious, but they are racy of the soil. Many of them still have the echo of the memories of the Indian tribes that enjoyed a peaceful life on the beautiful Island of Shells before the resistless overflow of Europe disturbed their dreams. Many bear the names of the grim pioneers who settled down there to make homes for themselves and to link their plebeian names to the soil. Some have the Scriptural flavor that tells of early Puritan settlers, and some are imported from well-remembered homes across the sea. But they all have the quality of the kind of men the Long Islanders were and are — men in grim earnest, to whom the refinements and delicacies of life were nothing to its grim realities: men who loved the smell of the sea and of the piny woods better than the stifling odors of the ball-room. Speonk and Smithtown and Jericho and Patchogue are names that carry memories and associations of their own; they bring back the beaches and the woods and the bays of Long Island to the wanderer wherever he may be, and they should not be relinquished to suit the whim of every summer boarder, nor should they be sold to gratify the vanity of every Crœsus who happens to stroll in the neighborhood. — *Brooklyn Times.*

The Old Meeting-house, Lower Merion, Pa. — There is a little old stone meeting-house in Lower Merion, Montgomery County, Pa., which is the object of peculiar interest to members of the Society of Friends. On October 4, 5 and 6 occurred the celebration of the structure's two-hundredth anniversary. The meeting-house measures but fourteen feet from floor to roof, and is more than thirty-six feet long and twenty feet wide. The walls, constructed of pointed stone, and in later years plastered in imitation of cut stone, are the walls of two centuries ago. The window panes are the small leaded diamonds of that old day, and the stone mounting-block still holds its place. In the building yet remains the heavy carved oaken table on which it was the custom to lay the marriage-certificate of newly wedded couples. The last couple whose certificate lay there were Benjamin Hunt and Hester Price, threescore years ago. The structure has also the distinction arising from the circumstance that William Penn attended many meetings there. — *Boston Transcript.*

Chimney-felling. — This is an art little known in the south of England, but, according to the *Bradford Observer*, it has its devotees in the textile districts. Mr. Smith, the Lancashire steeplejack, recently disposed of his forty-sixth tall chimney with ease and dispatch, thereby forestalling the laws of bricks and mortar, which threatened a descent without Mr. Smith's assistance. It seems to be the easiest thing in the world. The stack has lumps cut out of it at the base, one side being left alone, and props are then introduced into the gaps, shavings, paraffine and tar being liberally added, as the cookery-books have it. When all is ready, a match is applied, the smoke of its own burning rushes up the chimney, and in a few minutes the whole thing collapses. The chimney, which was 135 feet high, came down twenty-five minutes after the match was applied in the most docile fashion, and, what is more, it disposed its remains exactly as Mr. Smith, who stood close by, had arranged. — *Illustrated Carpenter and Builder.*

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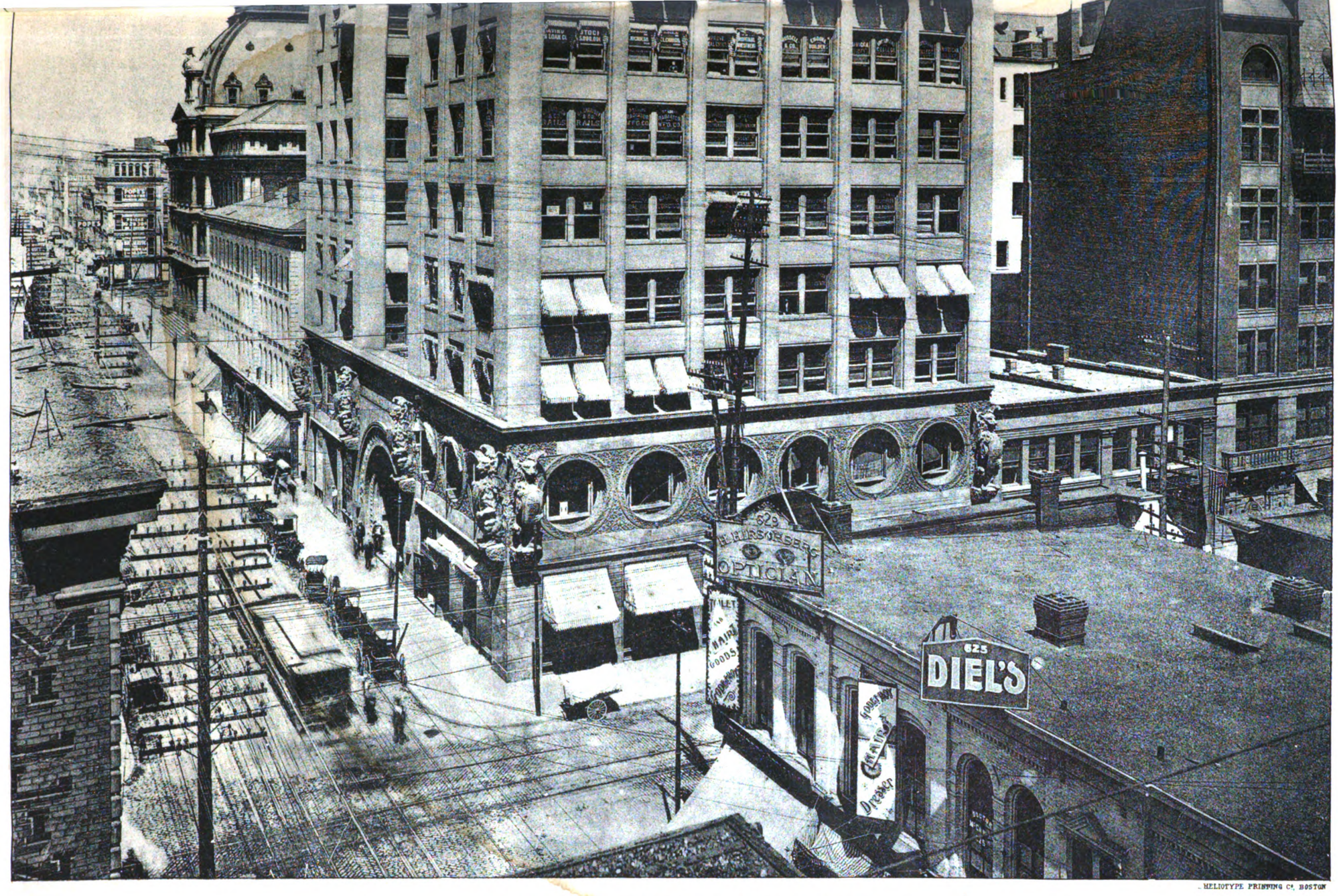
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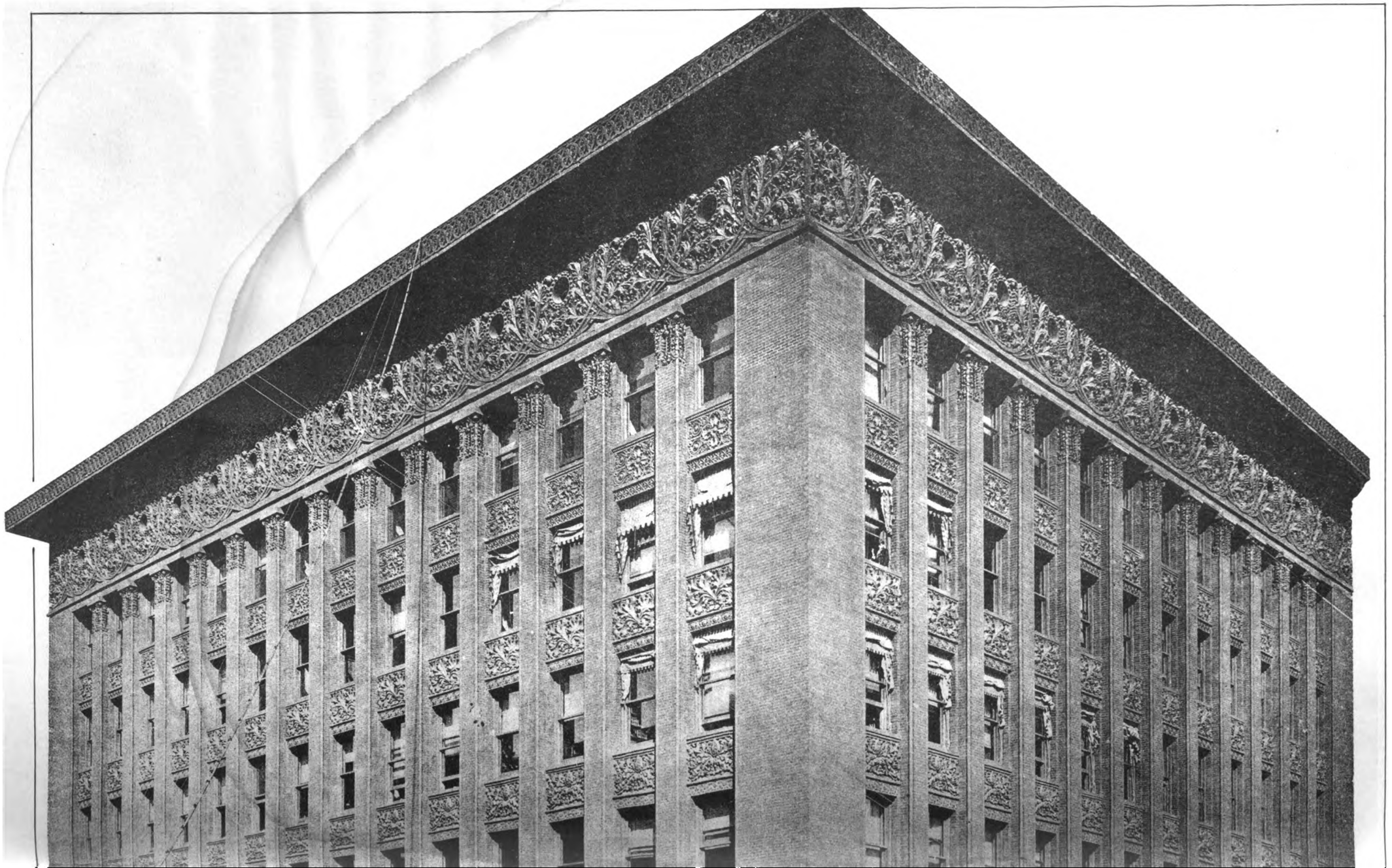
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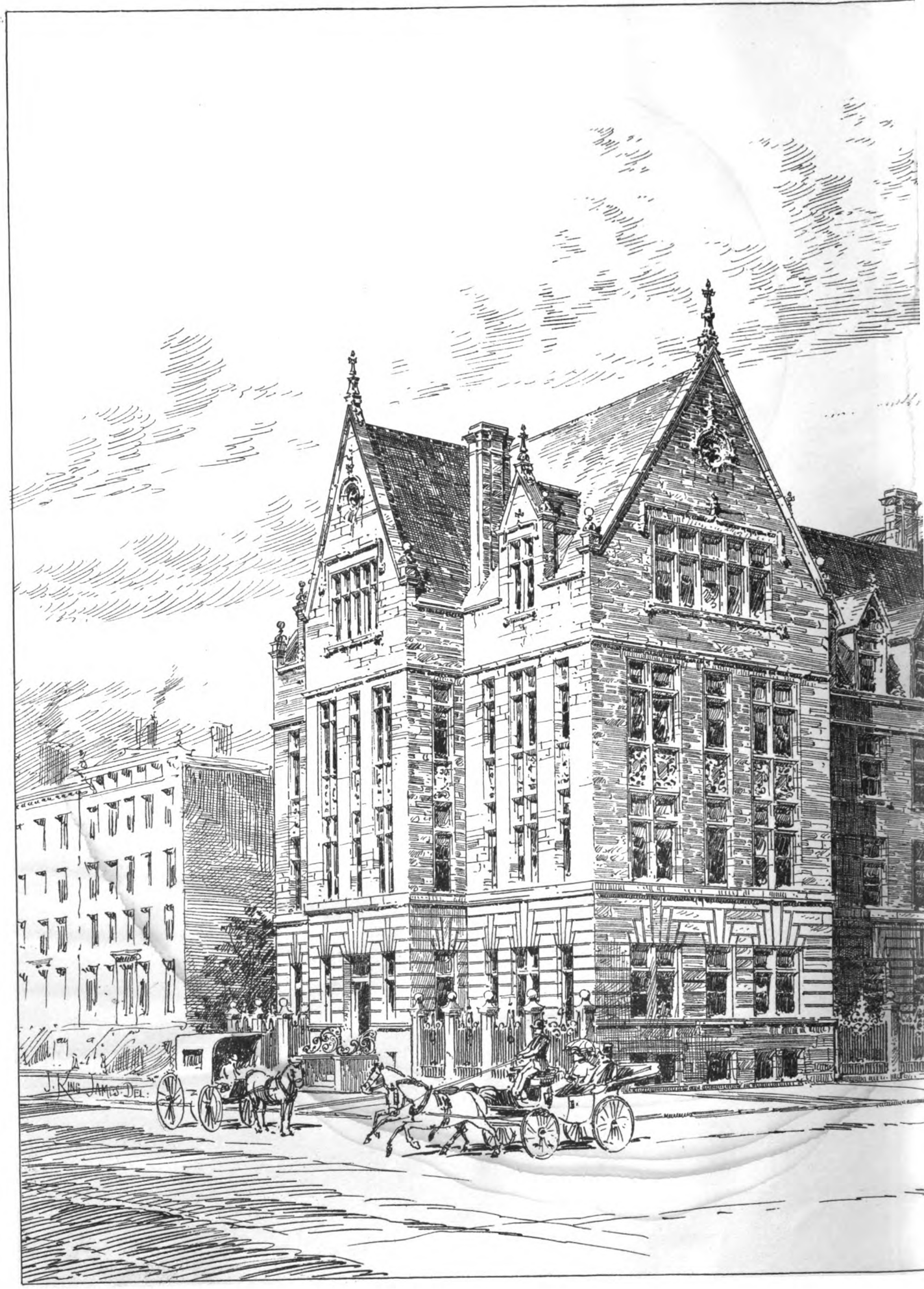
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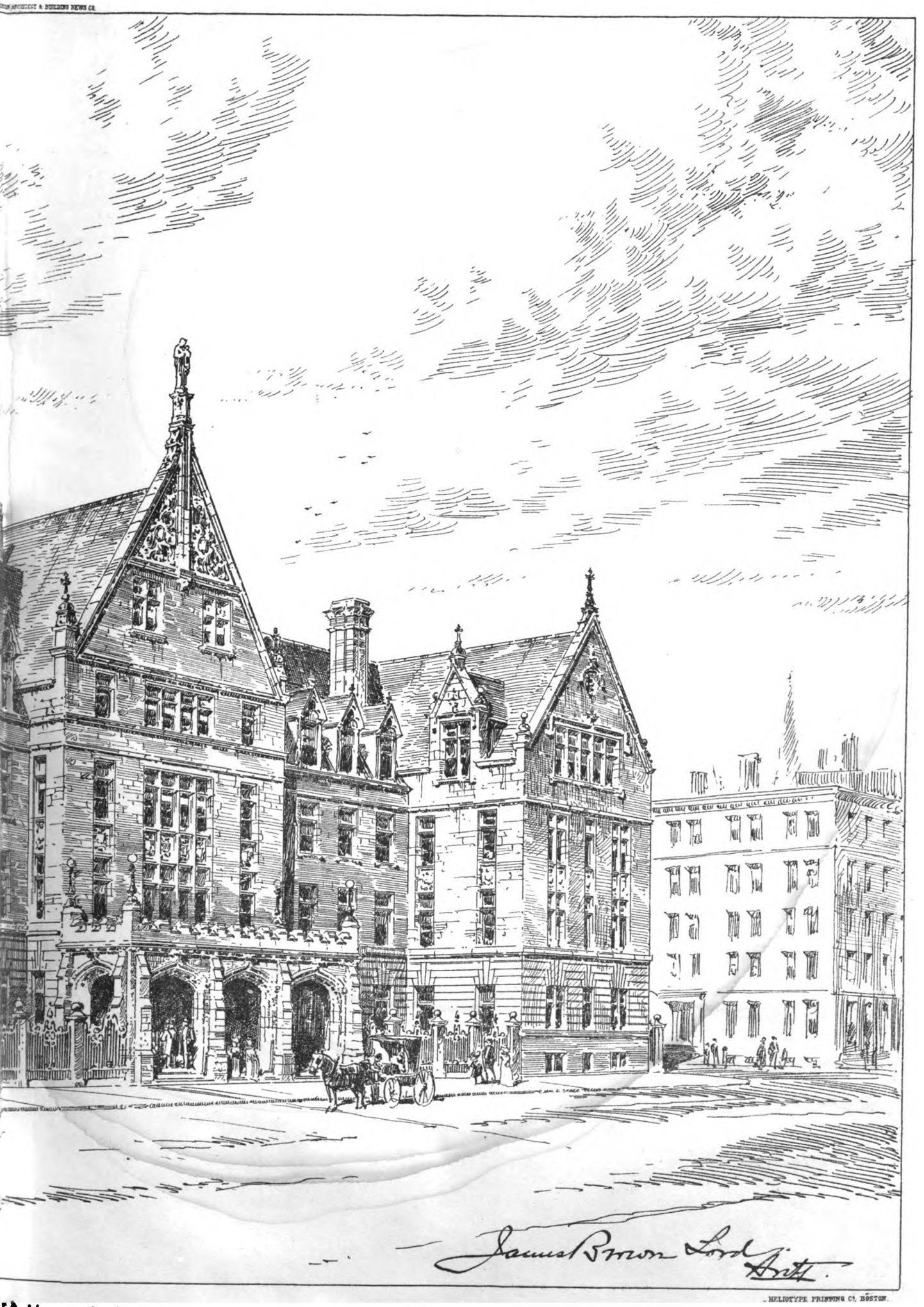
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OCTOBER 19, 1895.

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WILLIAM WETMORE STORY, who died in Italy the other day, at the age of seventy-six, had for many years been a conspicuous figure in American art. His countrymen, it is true, came to look upon him, on account of his long residence abroad, as something of a foreigner; but in Rome and Florence, and even in Paris and London, he was always regarded as the very type of an American artist, and America could hardly have had a more creditable representative. Not only as a sculptor, but as a painter and a poet, he was distinguished throughout Europe, and his prose writings, practical, romantic and philosophical, are well known to general readers. It may surprise people who have been accustomed to think of him as the chosen friend and companion of the Muses, to hear that his earliest, and perhaps most successful books, were law treatises; but every lawyer knows his three volumes of "*Reports of the Decisions of the Circuit Courts of the United States*"; and his work on "*Contracts not under Seal*" is already in its tenth edition, while six editions have been published of his "*Treatise on Sales of Personal Property.*" That the study of these highly practical subjects, to which he devoted himself for sixteen years, during his courses at Harvard University, and in his subsequent law-practice at Salem, was quite as good a preparation for the best artistic work as the diet of moonbeams and caterwauling which is supposed by so many feeble-minded youths in this country to be the proper nurture for painters and poets, is sufficiently shown by the extraordinary distinctions which he received, as an artist, from foreign governments. Although his Massachusetts Alma Mater never gave him any degree beyond the LL. B. of his graduating diploma, Oxford gave him its D. C. L. degree, which is the highest honor that England has to bestow upon intellectual excellence; France made him first Chevalier, and then Officer of the Legion of Honor, and Italy made him Commander of the Order of the Crown. His best-known artistic work in this country is perhaps the Everett Statue, on the Public Garden, in Boston, but there are many other statues and portraits by him, not only in Boston, but in other American cities.

SEVERAL Detroit architects have drawn our attention to the way in which the designs for the new jail to be constructed in that city is to be selected. It is hardly necessary to say that the firms which seek contracts for jail-building have been active in assuring the city authorities that "architects do not know anything about jails"; that "jail-building is a profession by itself," and so on; and the authorities seem inclined to listen to them. Whether the tax-payers will be so easily convinced remains to be seen. So far as the planning of jails is concerned, it is obvious that an architect, who has been trained in the general principles of planning and sanitation, and who has access to the plans of all the best structures of the kind all over the world, is more likely to produce a design in which the circumstances are utilized to the best advantage than a man whose experience is confined to the execution of one or two buildings of the kind under superior direction; while the advantage or, rather, the necessity, of placing under professional control the carrying-out of such complicated building contracts is too evident to require comment.

TROUBLES seem to multiply around the high office-buildings in New York. A few days ago, a fire occurred in the basement of the Pulitzer Building. There was not much to burn, and the fire was soon put out; but, in the meantime, the upper stories were filled with smoke, which might have been dangerous, and was at least very annoying to the inmates of the building. About the same time, a deputation, moved thereto, probably, by the complaints of the fire-engineers, that the upper portion of the lofty office-building could not be reached with water from the fire-apparatus, waited upon the Mayor, with the request that a new high-service system should be constructed, adapted for throwing water into the upper part of buildings fifteen or twenty stories in height; but was repulsed by his Honor, with the observation that the people who built such structures knew at the time the risk that they were incurring, and that the tax-payers were under no obligations to come to their rescue now. As a third instance, suit has been begun, as is reported, to compel the removal of certain cornices of the American Surety Building, which, at the height of two hundred feet from the ground, project over the adjoining property. This last matter, which may, in the end, involve the consideration of the right of the owner of a lofty building to take light and air from over his neighbors' land, has in it possibilities of a considerable change in the laws relating to real property, and it is likely that the "sky-scrapers" have plenty of tribulation before them.

THE Philadelphia authorities, or rather the Building Commission of the new Philadelphia City-hall, acting in connection with a committee appointed by the various artistic institutions of the city, have ordered a competition for designs for the decoration of the Council Chamber in the new building. All American artists, women as well as men, may compete. The sketches to be submitted must include a complete plan of decoration for the room, with a clear indication of the color scheme, and drawings showing all the important details, and at least two mural paintings must form portions of the design. For the best set of sketches a prize of three thousand dollars is offered. The author of the second best design will receive one thousand dollars; and seven hundred and fifty dollars will be awarded for the third best set. The Commissioners, who probably know something of the eccentricities of artists, do not bind themselves to confide the execution of the work to the author of the best design; but it is their desire to do so; and in that case, the compensation paid for the execution of the work will be in addition to the three-thousand-dollar prize. This stipulation is rather unusually liberal, and indicates a favorable disposition toward artists on the part of the Commission. The designs are to be judged by a jury of seven members, four of whom are to be artists of recognized standing; and these are to be selected in such a way as to avoid all suspicion of local partiality. That the controlling voice in the jury should be given to professional artists is another indication of the honorable intentions of the Commission, which will do much to encourage competitors. The competing sketches must be in the hands of the architect, Mr. W. Bleddyn Powell, at the City Hall, Philadelphia, on or before April 15, 1896. The right is reserved to exhibit publicly all the sketches submitted in competition; and no competitor will be permitted to withdraw his design until after the exhibition.

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ONE hundred and eleven sets of designs for the new Art Building of Fairmount Park, Philadelphia, have been received by the Commissioners of Fairmount Park. The plan proposed by the Memorial Hall Committee for judging the designs, which will probably be adopted by the Commission, is to refer them to a jury, consisting of the Provost of the University of Pennsylvania, one person to be selected by the Directors of the Philadelphia Academy of Fine Arts, and three disinterested architects, with two experts who are not architects, to be chosen by the Memorial Hall Committee. The jury is, according to the proposed scheme, to consider all the competing designs, and, on or before November 30th next, to report to the Commission, presenting eight of the designs, which they consider most worthy of the prizes offered.

ACCORDING to the Philadelphia newspapers, the prospect of having an adequate building for a fine-art museum excites great interest in the city; and with a public spirit quite characteristic of Philadelphia, several owners of valuable collections of works of art have already signified their intention of presenting them to the city outright, or, at least, of placing them on permanent exhibition in the Museum, as soon as the building is ready to receive them. In a quiet way, a great many valuable pictures have been of late years brought together in Philadelphia, and the public appreciation of such things, which has been developed, undoubtedly, in an important degree, by the fine works in the Drexel Institute galleries, is very wide-spread. The collections already promised to the new museum are said to represent an investment, on the part of their owners, of nearly three million dollars, and, in addition to this, a bequest of a million is said to have been made to the city for the purposes of the museum.

AN immense fly-wheel, weighing twenty-five tons, burst the other day in the power-house of the Hudson County Electric Light Company, in Hoboken, New Jersey, killing the engineer, and injuring several other persons. The cause of the accident, it is hardly necessary to say, was the excess of the tension caused by the centrifugal force in the wheel over the resistance of the iron designed to resist that force. Whether the sections of the iron were badly calculated, or its resistance was diminished by concealed flaws, is a matter which can easily be determined, and it ought to be determined without the delay, and expense, and uncertainty, of such proceedings as those in connection with the Ireland disaster. The civil engineers have long advocated the appointment of professional men of reputation, who should be sent, as experts, on behalf of the courts, to examine and report on just such cases, instead of compelling juries to listen to the bewildering testimony of expert witnesses, employed by two opposing parties, and influenced, not to say misled, in every possible way by the respective counsel, before they take the witness-stand as well as afterwards.

JUDGING from the insurance reports, the character of building in this country is slowly changing, fireproof, or, at least, fire-resisting, structures having begun to replace, to an extent which materially affects the total of losses by fire, the combustible buildings of the past generation. From 1893 to 1894, there was a diminution in the aggregate fire-loss, for the first nine months in the year, of nearly ten million dollars, or about ten per cent. From 1894 to 1895, there has been a further diminution, making a large additional saving to our people, who seem likely to finish the year with nearly twenty million dollars in their pockets, rescued in twelve months from the national ash-heap. Of course, a part, possibly the whole, of this saving may be accidental, but against this we must set the fact that a great increase has been made in the number of buildings, and the value of goods stored in them, within the past two years; so that an actual saving, in dollars, from year to year, shows a much larger proportional improvement in the conditions on which fire-losses depend. Even as they are, however, a great deal can still be saved out of the hundred and twenty-odd millions which we pay every year, partly directly, and partly through the insurance companies, in feeding conflagrations. It is hard to realize that this sum would keep all the people in the United States supplied with boots and shoes; or, if we preferred to expend it in another way, would pay the whole cost of maintaining all the public schools in the United States; or would pay the expenses of maintenance of the military and naval establishments of the United States, with the interest on the public debt in addition; or would pay the salaries of all the ministers in the United States at least five times over; or would provide every eighteen months a navy superior in force to that of Great Britain; or, applied to interest and sinking-fund, would provide every family in the United States with a twenty-acre farm, which, at the end of ten years, would be clear of debt. Any one of these things is within our reach at once, or all of them successively in due course, if we can only give up feeding our national ash-heap, and build in such a way that our buildings, and what we put into them, will not burn up. The rules of this sort of construction are well known, but, in order to carry them out effectively, they must be generally applied; for no care can protect a building entirely against combustible neighbors. Every good building, however, is a guardian and defence to those around it; and the people who are public-spirited enough to erect such buildings may find some satisfaction in the thought that every dollar of insurance premiums that they, or their tenants, or their neighbors save thereby goes directly into the pockets of the poorer people, who, in the end, have to pay all the expenses incident to the production, storage and sale of the goods that they buy, insurance premiums included.

THE arrogant and absurd assumption that Americans, under a free Government, do not build as strongly and well as the police-ridden Germans has received two valuable commentaries within a very short time. Three weeks ago, a building in process of construction in the Klosterstrasse, in Guben, a city of Brandenburg, collapsed, burying sixteen workmen in the ruins. Nine of the men were instantly killed, and the others severely injured. Last week, again, a spinning-factory, at Bocholt, in Westphalia, fell down, burying forty men, ten of whom were killed outright, while nine more were seriously injured.

THOSE architects who may be commissioned to design bird-houses should take to heart the following suggestions from the *Bautechnische Zeitschrift*. It is very common for people who set up houses or boxes for sparrows, martins, swallows, blue-birds, doves or other birds, to add to the little mansions a perch, or horizontal stick, or even a small piazza projecting from the region of the front door, with the idea that the inmates of the house may like to sit there in the sun on fine days, or that it may be convenient for them to have a place to alight for a moment before they creep into their nest. This practice, we are informed, is an objectionable one. It is true that the birds who are lawfully entitled thereto do frequently sit for a moment on the perch before they enter the door, but it is sad to relate that evil-disposed birds, such as hawks and crows, who have no rights in the premises, do the same; and, worse than this, when the young birds inside, supposing the visitor on the perch to be their mamma, with provisions, put their heads out of the nest, and open their bills, the visitor takes advantage of the opportunity to seize them, by putting his beak through the door, and carries them away for the refreshment of his own family. Crows, according to our authority, soon learn the convenience of this arrangement, and are very fond of establishing themselves on these little perches, and extracting the children of the lawful proprietors through the adjacent door. Bearing in mind the propriety of dispensing, for this reason, with exterior perches or promenades of all kinds, as appendages to bird-houses, another precaution should be taken to keep their inmates out of the reach of cats. Cats are quite as fond as crows of young birds, and, where a bird-house is accessible, find much entertainment, as well as nourishment, in sitting down before it, and clawing out the inhabitants, one by one, through the door. In the absence of means for elevating the ethics of cats, a good deal can be done to interpose physical obstacles to this sort of amusement, by setting up a square of board behind the entrance of the bird-house, a little larger than the entrance, and two or three inches away from it. The rightful proprietors of the establishment find no difficulty in turning around this defence, to reach their nests, while pussy finds it impossible to bend her paws around it, so as to reach the young birds behind.

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ART IN THE MODERN CHURCH.[1] — III.

ON UN-CHRISTIAN CHURCHES.



Fig. 1.

HAVING pointed out the element that must underly the production of all true church architecture, or of Christian architecture, as it may properly and more conveniently be called, we are now prepared to study some illustrative examples of churches that do not illustrate these fundamentals. We will thus gain a clearer conception of the many ways in which the Christian idea is avoided in current architectural design. And it is well to note, in selecting some few instances for review, that we are looking at them solely from this standpoint. Our present purpose is not to inquire, Are they architectural? Are they picturesque? Do they fulfil reasonable requirements of good taste? Or, do they answer their purposes sufficiently well? But, do they illustrate, in any way, Christian sensibility and feeling? Are they buildings we would instinctively recognize as Christian structures, consecrated to Christian and holy purposes? Are they characterized by a proper and true Christian spirit?

In looking at them from this standpoint, we must remember, further, that the inclusion of some well-known and readily recognizable feature in their design — some feature we instinctively recognize as churchly or which long familiar usage has accustomed us to regard in that light — does not redeem a structure without other Christian elements from an irreligious aspect. A tower, as we have seen, does not make a church, nor does a stained-glass window. Yet we have been accustomed so long to see these things in church design, that any structure which includes the one, or any wall which contains the other, oftentimes seems, at first glance, to be a holy edifice, whether it may prove so or not when judged by Christian standards. A very tolerable illustration of this is furnished by the subjoined Figure 1. Truly, it is not a good design for a church; there can scarce be disagreement on that point. But if not a church, what manner of building is it?

Those familiar with the town of Fairhaven, in Massachusetts, will at once recognize its Town-hall. But might it not as well pass for a church, as the average church is now designed? There are the towers, two of them, and a third little one perched on the apex of the high pitched roof, which might as well cover the audience-chamber of a church as the meeting-room of a town-hall. There are large traceried windows, of good size and convenient shape, apparently destined for stained-glass. There is a triple-arched entrance that seemingly leads to the vestibule of the church, while the dormers and gables suggest similar ends. In fact, it would be easy for this to pass as a church with a Sunday-school in the lower story.

There is nothing consecrated in this design; there is no hint of fervent faith on the part of the designer, nor of any lofty purpose which would distinguish this structure from any other. Yet we are



Fig. 2.

accustomed to see just such combinations in our average church design, and so we may unthinkingly say that, "This building looks more like a church than a town-hall," or, "The architect has followed the model of a church too closely in his design to make a successful lay-building." Yet this resemblance is not the fault of the author, but our own. We have so long looked upon such a combination of certain parts as churchly that we arbitrarily give a sacred significance to forms in themselves un-Christian, or attach a holy



Fig. 3.

association to them though they be devoid of any odor of sanctity. How baseless and foolish such an association is, this design shows in a manner almost admirable in its directness. Its author himself tells us it is not a church; and then we blame him for giving what we consider an ecclesiastical air to his structure! Quite failing ourselves to understand the really great lesson it teaches, that neither in certain architectural forms nor in their combination does religious architecture consist.

A more famous design than that of the town-hall of Fairhaven, a design, indeed, on which it is in a measure based, is the City-hall of Albany, in New York. This structure departs so completely from the traditionary form of the town-hall, as it has been developed in



Fig. 4.

the past three hundred years, and borders so near that of the church, as to be neither the one nor the other, and certainly recalls the church as easily as it suggests the civic edifice. The entrance porch, the tower, the large windows, the gables, the dormers, all have a more or less ecclesiastical suggestiveness that is entirely out of place in a civic building. Yet none of these forms are religious or Christian in themselves, and the only error in their use is the manner in which they approximate a false standard of church building we have created for ourselves in our own time.

The next figure, Figure 2, is a picturesque little design that might as well be a church as a "Mountain Inn," as its designers

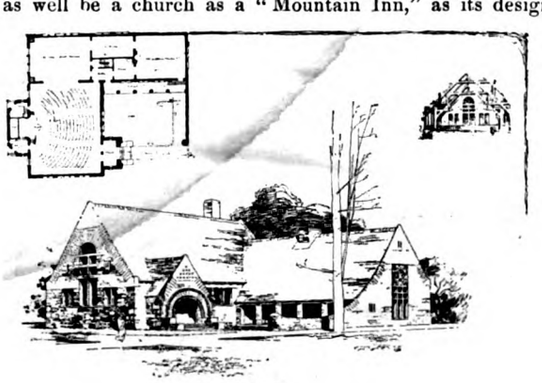


Fig. 5.

labelled it. Here we have a greater tower and a lesser; a high-pitched roof, and dormers lighting what is, apparently, the hall within. Where guests may be stowed in this hostelry is not visible from our present point-of-view; but, so far as our position goes, a simple change in the legend is all that would be needed to convert

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1033, page 16.

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this building from a hotel to a church. Yet how debased the art that by a mere change of name, will transform a lodging and eating house into a church of the Most High! How abominable the critic who would venture upon so impious a suggestion! Obviously, our methods of church designing must be wrong, our conception of



Fig. 6.

God's house erroneous, if we can so glibly transform a worldly structure into a sacred one! Yet, if our church architecture, as a whole, was characterized by that loftiness of feeling and holiness of purpose that rightly belongs to it, we should never, for a moment, make such comparisons. We should look, then, in our churches for other things than towers and high roofs, or dormers and traceried windows. It should be the sacred quality of the building we would seek out, the subtile thought that should redeem it from the mass of the world's worldly buildings, and set it apart as God's own.

And how shall we describe the structure shown in Figure 3? What manner of building is this, and for what purpose was it made? Intended as a church by its designer, it surely might as well pass as a dwelling-house of pretentious design, or a public hall. It can hurt

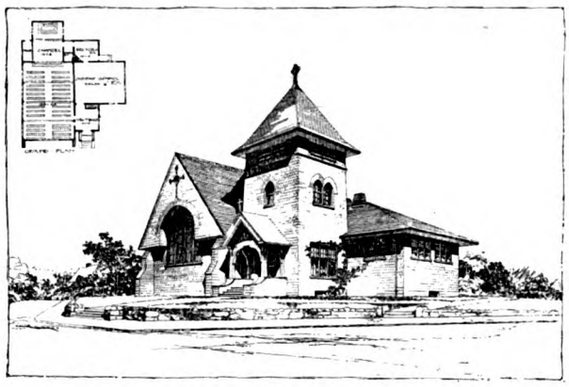


Fig. 7.

no one's feelings to say there is no element of Christianity here, no suggestion of holy usage, no hint of sacred association, no idea of godliness; for apparently its author never, for a single moment, considered any of these as essential to his work. It would be interesting to see a plan of this building, in default of the structure itself, for the idea of a single large room set apart for the solemn services of religion is so cleverly hid, that it is hard to tell what possible use the structure may be put to. That it is a church its author tells us, but that it does not look like a church, that it is devoid of every suggestion of Christian thought, purpose, use, must be evident to all.

Much less pretentious is Figure 4, though it errs in the same



Fig. 8.

direction. Why should this building be a church rather than a school-house or the town-hall of some small and retiring village? There is a tower — though it is scarce higher than the roofs — and there are the roofs, and on these two unecclesiastical elements its authors have depended upon giving a sacred air to their design. It does not matter that this is an inexpensive design, probably for a small and struggling community; that may well excuse its simplicity, but it does not affect the fact that as a piece of design there is nothing sacred in it. Knock off the cross from the apex of the roof, and there is nothing in the architecture to suggest that it is a church. It does not stand apart from other buildings by reason of its spirit or the quality of its art. A visitor to the town for which it was designed could well be excused for asking the townsfolk what it was for.

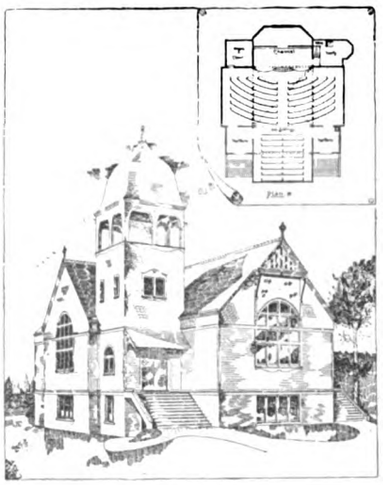


Fig. 9.

Nor is there anything in Figure 5 that suggests a church. Only by the process of exclusion, and a careful elimination of every other sort of structure would one finally be brought to admit that it was a church. It has not even a tower to add to the ecclesiastical aspect. It is a fair type of the country church, inexpensive, small and unpretentious, that answers to a well-defined and popular need in America. Yet in endeavoring to meet this want it did not occur to its author that a church was a different sort of building than a commercial building; it did not occur to him that he was erecting a structure dedicated to God, intended for pious purposes, which should tell all beholders of these purposes and their value to mankind. He brought together a few simple elements in an elementary way, and labelled them a church. It satisfied those who sought it of him, and what more could be asked? Yet, so far as may be judged from the drawing, not one of the parties to this transaction had a proper comprehension of the subject in hand. The element of Christianity is as wholly wanting in this design as though there was no such thing.

In Figure 6 is seen a more ambitious effort to produce a typical church easily distinguished as such. And yet what more does it show than a more orderly use of certain elements of architecture? The broad pointed roof, lighted by mimic dormers, naturally suggests the large room within, which the windows on the sides tell us must be amply lighted. To what uses the other parts may be put it would be difficult to tell without a plan; but here again, as in Figure 3, it is the cross upon the building that definitely determines its nature, not its structural parts. Yet architecture is a speaking art, an expressive one, and it should no more be required to place a cross on a church to point it out than that a large label, "This is a Church," be stretched across its wall. A cross upon a church is



Fig. 10.



Fig. 11.

a pious and proper symbol, but it should not be needed to explain the architecture nor to give it meaning.

Yet truly, were it not for the crosses upon the design for the church shown in Figure 7, why should we think it a church? Barring these, there are but three things in the design which would even so much as hint a church; the pointed roof, the pointed windows

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and the two small buttresses on the face of the main part. The tower, and the piece behind it, might as well be part of a dwelling as the vestibule of a church and its Sunday-school. That this is obviously an inexpensive design does not affect the question of its generally irreligious nature. Christian expression in architecture is not

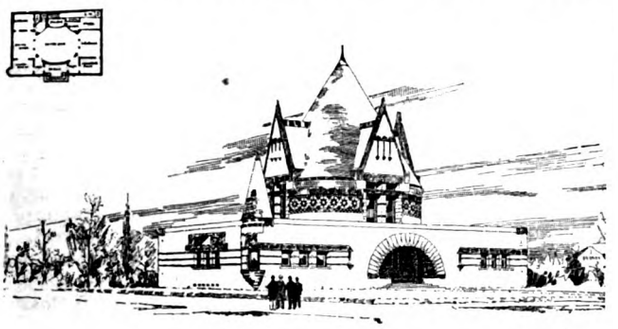


Fig. 12.

wholly dependent on the cost at so much per cubic foot, nor is it something the architect is called upon to measure out in accordance with the amount paid in to him for his work. The Christian architect — I use the word in the general sense it is employed throughout these papers — is a Christian architect all the time. A costly building may give him more ample opportunities for the display of his Christian talent than a relatively cheap one; but he does not reserve it for such expensive work, but freely gives it in all his religious undertakings. The church of to-day does not always display that lowliness of spirit and humbleness of purpose its Founder inculcated; but certainly it may be laid down as axiomatic that the same Christian feeling must run through all our Christian edifices Surely God is as much present in the company gathered to worship Him in this lowly edifice as in the grandest cathedral of Europe. So all our churches need this element to mark them as set apart for a consecrated purpose. And the item of cost has naught to do with it.

The church shown in Figure 8 is an unsuccessful effort to obtain an ecclesiastical effect in that style popularly called "Old Colonial." It is unsuccessful because in the tower and the window beyond some elements are introduced not in harmony with the other parts of the design. Yet here, as in all the instances we have seen, it may be asked, Is this a church, and why? And quite as promptly the answer would be, Because of its tower and the window aforementioned. Into the ecclesiastical character of these parts we need not inquire, because if we separate them from the rest of the picture it will at once be seen they have none at all. It is only when they are combined with the other parts, which in themselves have no religious meaning, that a combination is produced that suggests a church, and chiefly because it suggests no other structure. Of an idea of a church as a church, of a whole building, every stone and board of which speaks of Christianity, there is no hint.

Nor is there more in Figure 9. It is difficult to avoid recognizing the awkward architectural forms employed in this design, and certainly it is evident there is nothing in it which stamps it directly as a church and nothing else. The tower, on which so much dependance is usually placed, is distinctly unecclesiastical in form, as it is un-Christian in meaning. Nor are the windows much more suggestive of holy things. It is a design entirely devoid of Christian feeling, and might, so far as the external architecture is concerned, be put to half-a-dozen uses rather than set apart for the preaching of the gospel and the glorifying of God.

And surely the same may be said of Figure 10. Here is another strange tower introduced, apparently, to distinguish the building as a church, though it contains no other feature that suggests its purpose. Look at the picture as you will, be as prejudiced in its favor



Fig. 13.

as you may, and its distinctively unreligious nature will be apparent at every glance. It may, for all I know to the contrary, be admirably suited to the needs of the congregation that worships within it, but this does not alter the fact that, as a building, it does not suggest Christian ideas, nor does it point out the holy and sacred uses to which it is dedicated.

The church shown in Figure 11 belongs to the same class. The predominance of the chimneys in this design, and the varied outline of the plan and roof suggest a very multiform use for the building, quite as much as it suggests any ecclesiastical purpose. The tower is an open belvedere, seemingly erected for purposes of observation, and has not even that attempted ecclesiastical form we have seen in the designs previously noted. In no sense is this distinctly a church — a church and nothing else, a church speaking of God's message to mankind and the sacredness of its uses. A structure arranged within to suit the requirements of a certain form of worship, it completely fails to express the exalted character of these ceremonies in its architecture. Like all the designs we have seen, it might as well be anything as a church, and it thus avoids, with very great success, the first elements of Christian architecture.

Nor does the building, shown in Figure 12, which was designed for a Unitarian Church. There is a certain novelty in this design which gives it an attractive air, yet there is nothing Christian in it, nor does it suggest a sacred structure. The novelty of its form, the strangeness of this vast rectangle with a dormered circle protruding from it in an unexplained manner, destroys its Christian character quite as much as the absence of a Christian novelty in its architecture. We do not need novelty to mark off our churches, for surely here, as in many other instances we have seen, it is needful to ask, To what use is it put? before we can rightly classify it. Such a necessity is foreign to true architecture, which can tell the most complicated tales in the simplest manner. A church cannot be made a church by being designed like no other building on earth.

Figure 13, which is a design for a Mission Chapel, belongs to the same group. Might this not as well be a gymnasium or a public library? Would we know this to be a church without entering it or seeing its plan or being told what it is? The label the architect has conveniently inserted on the left of the main entrance scarcely tells the story, since modern missions are of many sorts, and not a few of them do not use a structure set apart for worship.



Fig. 14.

Figure 14 shows a design for a Methodist Church. Here is a picturesqueness akin to that seen in Figure 12, and here as elsewhere, we must ask, To what uses is it put? An architect who could build four towers to a structure so circumscribed in area as this must have had ample means at his disposal to produce a monumental design. Yet his object, obviously, was to produce something novel — in which he certainly succeeded — without in the least asking himself if the result was churchly and Christian, and if it adequately expressed the majesty and power of the Most High. That he has utterly failed in this must, I think, be apparent to every one who will keep this elemental principal well in mind when studying this design. And it must be confessed that in this neglect he has but followed the ordinary practice of the majority of his fellows.

BARR FERREE.

[To be continued.]

PREVENTION OF STAINING OF PLASTERING ON DAMP WALLS AND FIREPROOFED SURFACES.[1]

WHEN, in the early eighties, the use of hollow, hard-burned, fire-clay blocks first began to be general in New York City for fireproof surfaces, that is, for filling-in floors between iron beams, for building interior partitions and for furring walls, it was soon noticed that the plaster, particularly in the ceilings, began to show curious spots.

In some cases the ceiling would be discolored here and there, in others there would be a white, fuzzy growth apparent, which on testing would be found to be some soluble salt.

The first conclusion generally reached was, that water must have been spilled and, trickling through, made the stains, and that the

[1] A paper by Mr. Louis de Coppet Berg, F. A. I. A., read at the Twenty-ninth Annual Convention of the American Institute of Architects held at St. Louis, October 15–17, 1895.

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dampness in combination with the salts and chemicals in the materials through which it had been, formed this growth. Of course it was a simple matter to wipe off the ceiling and then proceed with the preparatory coat and the kalsomining, only to find that the kalsomine would at once discolor under these spots, and later frequently in many other places. Oil paint did not remedy the trouble, for even where three or four coats of oil paint were put on the discoloration and spots would come through.

I can remember distinctly the many different guesses and theories which architects and practical builders indulged in. The first thought, of course, was that the plastering had not been allowed to dry out long enough. Later, the spots were ascribed to dampness remaining in the concrete. Then, as cinder concrete began to be used, other wiseacres thought it was due to something in the cinders. This theory, however, was not entirely tenable, because the same spots would be found in the vertical partitions and furrings, where certainly no cinders came in contact with them.

This led to the suggestion that it must be either something in the mortar, of which the joints were made, or else something in the clay, of which the blocks were made, for it certainly could not be in the plaster itself, which when applied to wooden furrings and lath, or to iron lath, did not show these spots, but only when applied to fireproof work or to damp walls. Of course, it once being ascertained that these spots were unavoidable, the next thing to do was to find the remedy.

Some fifteen years of research in this line, however, have shown that it was not an easy thing to do. In some cases the remedy apparently would work and then fail in others. The remedies suggested were of various kinds; such, for instance, as washing the plastered surface with diluted chemicals, a solution of alum being a great favorite for a time. Another remedy was to shellac the spots or to shellac the entire ceiling; but in most cases the spots came through the shellac. Others were to apply patent preparations, such as "Duresco" or "Lithogen" for the first coat. Again, the use of cold-water paints or patent paints was suggested. But all of these remedies were so fallible, that a prominent New York architect, when once asked how long it took before one could *safely* decorate on fireproof work, replied: "About ten years," and he, apparently, was not far from the truth.

The writer believes, however, that now a permanent and successful remedy has been found, and to lay this before you is the object of this paper. Its discovery was accidental and it was this way:

We were doing a large building for Yale University, — the new Sheffield Scientific School Chemical Laboratory — and while we could not afford fireproof work, wooden furrings on the outside walls had to be avoided for practical reasons, as most of the hoods, fires, etc., were located against the outside walls. In this dilemma we suggested coating the walls with tar, and plastering directly on the tar, a well-known practice. The building was put under contract and all measurements for the constructional parts and the furnishings made on this basis, when the Professors in charge of the work began to have fears in regard to the use of tar on the walls, on the score that the live-steam pipes and the hood would subject the plastering to so great a heat, that they would melt the tar behind the plastering, and let the plaster down.

Experiments made in this direction proved them to be right — that while the plaster would cling to the tar perfectly, it would lose its hold when the surface of the plastering was thoroughly heated.

In this emergency something had to be devised. It was too late to attempt any furring of the walls, even if the expense had not to be considered. After a number of consultations, it was decided to try the use of asphalt varnishes in place of the tar, hoping that they would be so much thinner, that is, have so much less body, that they might not melt under the influence of heat applied to the plastered surface. All of the various asphalt varnishes which could be obtained were bought and experiments made. It was found, however, that some were so thin that they soaked into the brick, leaving no damp-proof surface; while others had so much body that they (like the tar) would melt and allow the plastering to sink down when the latter was heated.

At this stage of the experiments, Prof. H. L. Wells, of the University staff, undertook experiments on his own account, and succeeded in producing an asphalt varnish, which could be easily applied cold to a wall surface, and which was yet so fluid that it would run all around a grain of sand or into the slightest indentation in the brick or mortar, making a perfect continuous asphalt coat over the entire surfaces; that is, reproducing in the asphalt *exactly* the same surfaces that had been there before it was applied. The asphalt was not absorbed by the brick, nor did it thicken in places. The result of having practically the same surfaces (as on the bricks and mortar) for the plastering to take hold of made it adhere very thoroughly; while the asphalt itself, being so thin, it was found impossible to melt, when experiments were made in that line. After the plastering had been allowed to set very hard, pieces were broken out with a hatchet, and, in many cases, a piece of the brick would come off with the plaster. On examining the broken edge, the asphalt could not be seen, so thin was the coat; yet, when the brick was carefully picked off there would be the perfect coat of asphalt between them.

After numerous experiments, it was finally decided to use this material, which the Professor very aptly named "Antihydrine."

The antihydrine proved a success far beyond our expectations, some of the results being quite startling. The scratch and brown coats of mortar on the exterior walls, owing to the fact that the only dampness in them was the water in the plastering itself, dried out very quickly; and dried out of such a perfect and even color, that the brown coat looked very much clearer and better than the hard finished plastering on the interior brick walls, which had been done before the decision as to how the exterior walls should be coated had been reached. These interior brick walls were not heavy walls, and as they had had heat applied to them on both sides for several months before they had been plastered, it was rather surprising to find that they should spot up so badly, while the exterior walls, (to which, of course, the antihydrine had been applied) dried out so beautifully and smoothly.

After the hard finishing had been put on the exterior walls, a constant watch was kept upon it to detect the first signs of staining, but none whatever appeared, proving distinctly that as a waterproof furring material for outside walls the antihydrine was a success.

This at once led to the suggestion that it might be a good material to stop the staining of plastering on fireproof work.

Experimental arches of fireproof blocks were built, covered with antihydrine on the under side, and then plastered, while cinder concrete was placed on the upper side and kept moist; no staining whatever occurring in the plaster, which dried out perfectly.

Since then, in all our fireproof buildings, we are omitting furrings entirely, covering the walls with antihydrine, also similarly covering all fireproof surfaces of partitions, ceilings, etc., before plastering.

Further uses of this material suggested themselves as follows:

When certain walls in the cellars of the building were whitewashed, the whitewash at once discolored from the dampness in the walls. It was decided, therefore, to use the antihydrine on some of the walls that had not yet been whitewashed, and it was found that on these the second coat made a beautiful white finish entirely free from stain. This at once suggested the application of the material to already hard-finished stained plastering as an under or preparatory coating for painting or kalsomining; the idea being, that in buildings where the plaster was already discolored, this material might be used on the surface of the plaster. These later experiments, however, proved entirely unsuccessful, neither the paint nor the kalsomine working well, where the antihydrine was applied to the outside surface of the plastering.

The next suggestion for the use of the material was in connection with limestones, marbles and similar cut stonework, where it is necessary to protect the delicately-colored stone from the staining, due to the use of cement in the mortar of the backing-up joints. Experiments made proved it to be successful. By painting the bottom bed of the lowest layer of stones with the antihydrine, painting the back of each course (and the joints) as they are laid, the use and expense of LaFarge cement in the backing can be avoided, ordinary mortar being used instead.

The method of using the antihydrine is very simple; it is done up like other varnishes in cans, which are opened as needed, the contents poured into pails and the material then applied to the surface with an ordinary whitewash brush; it requires no skill whatever for its application. An apprentice or common laborer can do the work. A gallon of the material covers about 100 square feet, the cost being about one and one-fourth cents a square foot, not including the cost of labor, which would vary in different localities, but does not swell the cost seriously. Of course, the saving of the fireproof furring more than offsets the cost of the antihydrine itself on exterior walls; while on fireproof work the advantage of being able to retain a perfectly white surface in those buildings — for instance, where no painting is to be done — or of being able to paint and decorate without risk, is well worth the cost.

There is a curious difference in the method of using the material; for instance, where plaster is to be directly applied to it, experience so far has indicated that it is better not to put on the antihydrine until the last moment, say within twenty-four hours of applying the first coat of plastering, so that the material may be still soft or "tacky" when the first coat of plastering touches it. The plastering will adhere to it when dry, but it seems safer and better to put it on the still moist material. The first coat of plastering should in every case be a scratch coat and be put on as thin as possible to get through scratching, and allowed to dry thoroughly before applying the brown coat. In the case of whitewashing, exactly the opposite seems to be indicated. The antihydrine should be put on as long in advance as possible and allowed to dry thoroughly. Even then the first coat of whitewashing seems to creep and not to take hold very well, though the second coat will fill out the crevices and make a good finish.

When applied to the back of stone the backing up can be done immediately after the antihydrine coating has been put on, providing, of course, care is taken not to damage it.

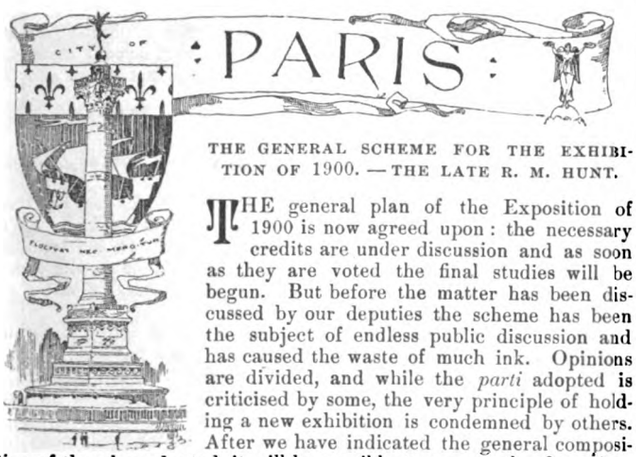
Of course, the material is new, having only been discovered last winter, but the writer is using it very extensively in his practice, and has perfect confidence that it will continue to act as it has done so far in its career.

There are additional uses to which the material might easily be put; but these, not having been used in actual practice, should be subjected to experiment before being used on any extensive scale. For instance, for damp-proofing in old walls, where it was impracticable to dig up on the outside, it would seem that this material applied to the inside should remedy the trouble. Again, for damp-proofing

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cellar bottoms, which are slightly damp and moist, it would seem that a smooth coat of concrete, thoroughly covered with this material and then protected on top with an additional layer of concrete or cement, should prove a cheap and good water-proofing material. Even where there is pressure of water, it might possibly answer, providing sufficient weight were put upon it.

As a final warning, it should be said that in every case where the material is used, before covering it in with plaster, whitewash or other substance, the surface should be carefully looked over to see that the workmen have uniformly coated all parts; as, of course, any small part omitted would allow dampness to come through.



THE GENERAL SCHEME FOR THE EXHIBITION OF 1900. — THE LATE R. M. HUNT.

THE general plan of the Exposition of 1900 is now agreed upon: the necessary credits are under discussion and as soon as they are voted the final studies will be begun. But before the matter has been discussed by our deputies the scheme has been the subject of endless public discussion and has caused the waste of much ink. Opinions are divided, and while the *parti* adopted is criticised by some, the very principle of holding a new exhibition is condemned by others. After we have indicated the general composition of the plan adopted, it will be possible to answer the first class of critics and then to discuss the position of those who believe we should hold no more international exhibitions. This last is rather a radical belief to hold, and I confess I do not share it, while I understand it and find that the reasons for the belief can be defended. Those who oppose the Exposition of 1900 — and many notable men can be counted amongst the opponents of the scheme — attest the too frequent repetition of these gatherings and deplore their abuses. Each year one hears of one or more of these exhibitions, the success of which is doubtful at the start, while the most positive result is to weary the public with identical manifestations, to say nothing of the manufacturers who receive only negative benefits after having met considerable expenses. There is, then, a distinct feeling of weariness which must be taken into the account in the future, a weariness which this year is manifested in characteristic fashion. Articles have appeared in the daily papers which have swayed public opinion, but it ought to be said that the greater part of these articles, although some of them are very bright, rest rather on literary paradoxes than upon serious ratiocination. The arguments advanced in a Paris journal by a *boulevardier* who dreads to have his comfort disturbed by the mob of foreigners who will invade Paris are not to be taken seriously. But one must give greater attention to the protest of the "Ligue de Décentralization," of Nancy. This league, some time ago, sent to all the Conseils Généraux of France a proposal that all should join in a protest against the Exhibition of 1900. This suggestion, that may have been instigated by electoral reasons or by local interest, was coldly received, even the Conseil Général of Nancy itself contenting itself with demanding that an inquiry should be made as to the opportuneness of holding the exhibition, while only three Departments gave the suggestion any consideration. Such manifestations as these give the promoters little uneasiness, so far as this next Exhibition is concerned. But it would be wrong to take no account of the movement that is beginning against the too great frequency of these international shows, for it may possibly happen that the Exhibition of 1900 shall be the last of the series. This very possibility is a reason for holding it, and a reason for making it exceptionally grand, so that it may be the apotheosis of the closing century, the solemn review of its genius and its progress. It would be also a reason for approving the scheme of M. Picard, the Commissioner-General, in all that concerns the construction of the new buildings which are to be erected on the Champs Elysées, and the final transformation which must leave, after 1900, in that part of Paris which is now so fair, a grand and monumental aspect and which should date an epoch in its history.

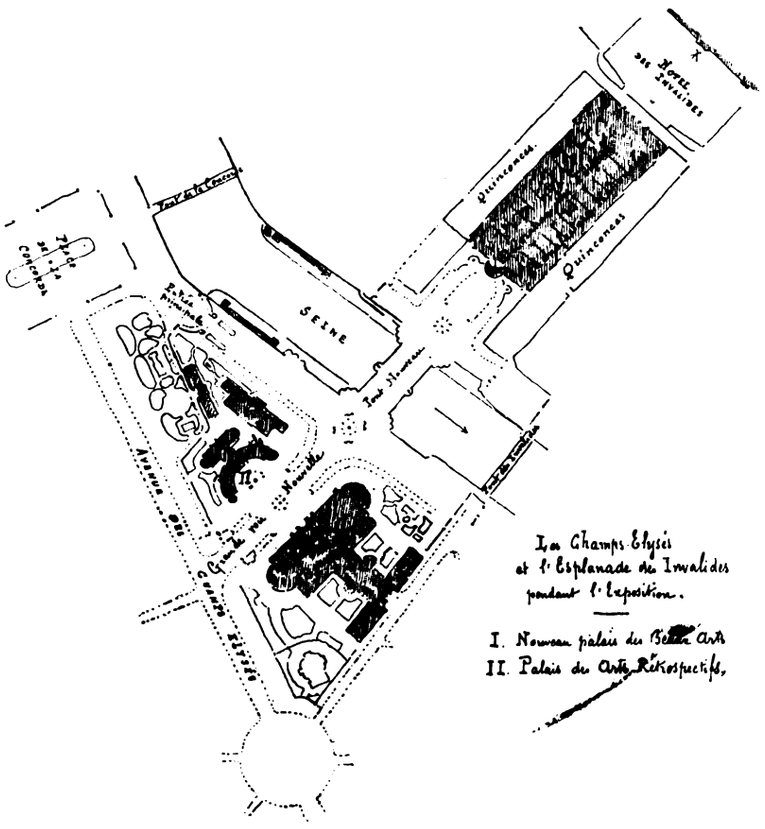
But such results cannot be had without certain sacrifices which are repugnant to narrow and routine minds, minds hostile to all that is new, whatever it may be. Such are those who criticize the scheme that has been presented, the scheme we are now going to examine. The report of the Commissioner-General tells us that the utilizable area will approximate 108 hectares, while the floor-area of the several buildings and pavilions will be about 39 hectares as against 26 in 1889.

In spite of this increase of floor-space, the desire to leave for the public extensive parks and gardens and also certain motives of economy have caused the introduction, in several places, of exhibition-halls in the first story. In spite of all the ingenuity that can be displayed in making these up-stairs halls easy of access, I believe that they are making a mistake in this arrangement which experience ought to have caused them to avoid.

The great question to be settled at the very outset was whether to preserve or to destroy the Palais de l'Industrie, for upon its solution depended the execution or the abandonment of the wide new roadway which should open from the Avenue of the Champs Elysées the perspective of the Esplanade des Invalides and Mansart's dome.

This *parti*, which was adopted by certain of the competitors at the time of holding the original competition,[1] made a great impression on the jury, and the Commissioner-General and his coadjutors came to feel that this solution was imposed on them. "Whatever may have been the usefulness of the Palais de l'Industrie," said Mr. Picard with much justice, "no one can defend its artistic merits very strenuously. No one will fail to recognize the unfortunate position to which it has been assigned. From the very day it began to rise above the ground the critics cried out against the destruction of one of the finest perspective views that Paris afforded, and condemned this heavy and compact mask that was being interposed between the Champs Elysées and the dome of the Invalides."

Yet now that it is wished to restore to Parisians this fine view and replace the old palace — which in any case would have had to undergo costly alterations — by a new building, finer and better suited to its purposes, lo and behold there appear a certain number of Parisians who cry out, "To the rescue! Help!" declaring that their Champs Elysées is about to be devastated. But do they really know just what it is proposed to do?



The new promenade opening from the Champs Elysées on the axis of the Invalides would cross the Seine by a monumental bridge 60 metres wide. On the right, looking toward the Invalides, would be the Palace of the Fine Arts, while on the left and facing it, but of smaller dimensions, would be the building of the Retrospective Exhibition of French Art. These two buildings and the bridge, which are to be the subject shortly of a public competition, would be the only permanent structures of the Exhibition. This fair group would be set off by porticos, exedras, shrubberies and flower-beds. The bridge would be built of cast steel.

The chief entrance to the Exhibition would be from the Cours la Reine at the side of the Place de la Concorde, and visitors would find on the bank of the Seine a broad avenue adorned with terraced gardens leading to the Palace of the Fine Arts just mentioned. Across the bridge and near the river, on the Esplanade des Invalides, would

[1] See *American Architect* for Feb. 9, 1895, No. 998.

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be built a series of palaces for those groups which are allied to decorative art. Thus the region neighboring to the present Palais de l'Industrie and the Esplanade des Invalides would constitute the domain of art.

Between the Pont des Invalides and the Pont de l'Alma on the right bank of the Seine would be placed the building of the City of Paris, the Horticultural Building and the Palais de l'Economie Sociale et des Congrès. On the left bank, in front, would be the pavilions of the foreign powers, isolated and varied in form so that they would constitute a superb framing for the Venetian fêtes. Next to the foreign pavilions would come the buildings of the Army, the Navy, the Merchant Marine, Forestry, Hunting, Fishing, etc.

The Trocadéro would have the Colonial exhibits and, finally, the Champ de Mars would be given up to Manufacture and Agriculture. Two ranges of buildings of the same general aspect, yet having characteristics suited to different groups, would be placed *en echelon* along the Avenues Suffren and La Bourdonnais, leading up to an immense *château d'eau* with its cascades, and to the Palace of Electricity. Each of the buildings would accommodate on the outer sides the raw product and on the inner sides the manufactured results, while the centenary exhibits could find their proper places in the transverse galleries that separate the several groups. The entire circumference of the gardens surrounding these buildings would be arranged in terraced porticos admitting of circulation above and below.

The Machinery Gallery of 1889 would be preserved, but both the form and the use to be made of this building would be modified. At the centre would be the Salle des Fêtes, of which the Electricity Building would serve as the brilliant vestibule. As to the Eiffel Tower, it will be allowed to remain. Many of the competing architects attempted to use it in their designs in a modified form, but no satisfactory treatment was devised. As to entire suppression and removal, that, unfortunately, can be brought about only by paying a heavy indemnity to the society which owns the concession.

These are the general lines of the plan that is to be submitted to the Chamber and for the execution of which twenty million dollars will be needed.

The preliminary report of the Commissioner-General, from which these facts are drawn, does not enter at all into details, but leaves ample opportunity for private suggestion and inventiveness.

I do not wish to close this letter without making known to our American *confrères* the feeling that has been aroused here by the death of Mr. Richard Morris Hunt. and I will make a few extracts from an article devoted to him in *L'Architecture*, the journal of the Société Centrale des Architectes Français.

"The disappearance of an artist of Mr. Hunt's worth is a considerable loss to art, particularly for that essentially French art, which the much-regretted master had, more than any other, aided in implanting, and causing it to be loved, in the United States. . . . He came to France after having made good progress in his studies at Geneva, to complete them at the École des Beaux-Arts and was later employed on the works of the Louvre and Tuileries as inspector. Every one knows in what esteem he was held by Hector Lefuel. . . . Mr. Hunt was one of the architects who contributed most to give to the World's Fair at Chicago in 1893, that character for grandeur which has been attested by all who visited that Exhibition. . . . The name of Mr. Hunt was well known on this side of the Atlantic. He was recognized everywhere as a master and his reputation was only increased by the homage that was justly accorded him in Europe. In 1887 Mr. Hunt was elected Corresponding Member of the Société Centrale des Architectes Français, then, later, he was made an Honorary Member of the Royal Institute of British Architects and, later still, Corresponding Member of the Society of Engineers and Architects of Vienna." Following a further enumeration of the titles and honors he had won, the article closes thus:

"Professor of great eminence, Mr. Hunt had the forming of many pupils, who, at the present time, hold the first rank amongst American architects. A charming and witty companion, overflowing with frank cordiality, Hunt counted many friends and comrades amongst French architects. All will regret him and long bear him in memory. Every one knows that Richard Morris Hunt was the leading spirit in bringing about the foundation for the pupils at the École des Beaux-Arts of the Prix de Reconnaissance des Architectes Americaines."

ELECTRIC HEATING.[1]

COLD transmission of electric energy means the economical transfer of power.

The heating of any part of the system of wires or other conductors, whether in the battery or the mechanical generator from which it starts, or elsewhere, is waste or loss in proportion as the temperature is raised in the various mediums of transfer.

A conducting medium requires to be no less in capacity than its necessities, to carry electricity with the highest economy.

It is, therefore, apparent that if cold transmission is economy, to obtain heat is at expense (not to say, however, that even cold transmission is free from cost, in loss, and a small amount of heat).

It is likewise apparent that if freest transmission is freest of heat, that impediment or resistance to transmission is a method for obtaining heat.

This fact is utilized where heat is required.

The proportion of heat developed is related exactly to the blockade to the free transfer of electric energy; the blockade, therefore, may be designed in exact proportion as to the heat desired at any local point.

Joule found the number of units of heat developed in a conductor is proportional:

I. To its resistance;

II. To the square of the strength of the current;

III. To the time the current lasts.

The blockade to flow, better known as resistance in the circuit, may be placed just where the effect is desired.

The commonest illustration, and by the brilliancy of its effects the most striking, is the incandescent-lamp.

Modern invention has so perfected the system of lighting, that an entire installation may, to the casual observer, be cold throughout every appliance from the power belt to the last lamp, except in the little wicks themselves.

The little lamp has heat in it, in spite of the old name given to it, "light without heat."

The ordinary incandescent-lamp itself is utilized now as a heater of small capacity and requirement.

One may buy a tea-pot, constructed to enclose under the tea-vessels an 8-candle-power lamp, which is sufficient to keep up a temperature agreeable to the afternoon-tea server. Or a 16-candle lamp will keep boiling water at the boiling-point, or in the same utensil a 50-candle lamp will raise two or three pints of water to the boiling-point in twenty-five minutes.

This use of the small electric lamp is simply an effort to obtain something unique and exquisitely cleanly for such a purpose.

We have all observed that waste or radiated heat is exceedingly small compared with older forms of lamps, such as that of oil and gas.

In 16-candle-power, while the incandescent-lamp will raise 14 pounds of water 10° Fahr. in the heat given off in an hour's lighting, a kerosene Argand burner will raise to the same degree 331 pounds, or nearly twenty-four times as much.

Certainly the incandescent-lamp filament cannot be looked upon as a factor in designing an article for commercial heating. Its cost as a heater would many times exceed the usual methods.

It may be observed in passing: Much has been done in the search for a cold light, and some surprising results have been attained in the use of vacuum tubes, giving many hundred times the efficiency of the common incandescent-lamp. In it the electric alternating current of high frequency is used.

So that, as the glow-lamp, hot as it is, was welcomed as a "light without heat," we may not accept too much to look forward to the vacuum tube and the electric alternating current for a greater stride towards an absolutely "cold light."

The temperature rises quickly in the incandescent-lamp wick because of its fineness and short length. The nature of the resisting medium has to do with the rise of temperature. Platinum was early used for lamp wicks; its nature differs greatly from many metals as a conductor of electric current and likewise as a conductor of heat. Comparing it with silver: the capacity of silver for heat is twice as great, but the specific resistance of platinum to flow of current is nearly seven times as great as silver.

The rise of temperature, therefore, as between these two metals under similar conditions, would be about 12 to 1 in favor of platinum.

Therefore, in selecting a resisting medium for local heat effects, one must use wisdom, being governed by efficiency of metals and with a proper view to their cost, etc.

We have referred to the incandescent-lamp as an illustration of heating effect, and shall later use the principle set forth by it in other connections.

The electric arc, however, furnishes us the highest type of electric fire with which we have any familiarity. Just here we must express the wish that our Club may soon have, as a part of our paraphernalia for experimental purposes, all the varieties of electric current "on tap"; for had we access to an arc circuit now, we might place upon the screen the arc, and at our leisure study it. We would find in it "a thing of beauty" and an instructive physical phenomenon.

As early as 1878 it was my pleasure to talk to a vast audience, with a projection of the arc on the screen, where the ¾-inch carbons were shown 16 to 20 inches across.

It was a wonder then as we looked at the ebullition of the carbon and speculated as to its power, and prophesied about its future.

Since then we have been instructed concerning the steady habits and constant principles of the artificial orb.

Doubtless the greatest heat obtained by electric energy is that developed in the electric arc.

While the name, which Davy gave to the stream of pulverulent carbon projected across the space between the carbon rods, has attached itself to all lamps of its class, it must not be understood that the arc itself is the source of the illumination or the seat of the enormous heat (the chief cause of light).

When continuous currents are used, the light is chiefly due to the intense heat on the surface of the positive carbon, which is heated and wasted about twice as fast as the negative.

The negative carbon has also great heat, and consequently emits

[1] A paper by J. Chester Wilson, read April 20, 1895, before the Engineers' Club of Philadelphia and published in the *Proceedings*.

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some light. In the positive carbon the white heat of the crater may be obtained by a smaller electric current than 5 to 10 ampères, and 40 or 50 volts, usually employed. Both Violle and Thomson agree that increasing the voltage or current beyond the point of volatilization of the carbon does not increase the color or intrinsic brilliancy of the light, a uniform lightness of the crater surface is maintained in pure carbon, even should there be variation in the potential.

An increased current and pressure will burn away by oxidation more carbon and lengthen the arc and widen the crater surface, from which the increased brilliancy is emitted.

Violle attempted to measure the temperature of the arc, and has decided it is about 3,500° Cent., which is simply the point of volatilization of carbon.

In this intense heat, platinum and gold are vaporized readily, and the diamond as readily fused. The first use of the arc was not for its lighting power, but for heating.

It is fifty years since Cowles first used the heat of the arc in a reduction furnace for obtaining aluminium copper alloys. He depended upon the heating effect alone and procured only alloys. His furnace was simple. Later workers use both the heating effect and electrolytic effect.

Herault uses another form wherein one pole terminates in the usual carbon rod, while the other is shaped to be a crucible of carbon; 12,000 to 15,000 ampères of current are used, and a low voltage.

The charming feature of an electric furnace is the advantage of being able to introduce the necessary heat to the inside while the chamber is hermetically sealed, and utilize the heat there.

Combustion of foreign material in large quantities, as the necessity is in other furnaces, is eliminated to the advantage of the ore or metal being treated, preserving its purity after being reached.

At the present time the Patent Office is receiving a great many applications for furnaces, especially wherein the electrolytic effect is taken advantage of, and a variety of chemicals are recited as being effective for various operations.

But a few years ago aluminium was sold at $100 per pound; now it is being utilized in the manufacture of a vast variety of things, wherein there is a profit at 75 cents per pound. (The market value of the metal runs to-day from 45 cents for least pure, up to 65 and 70 cents per pound for the best.)

In domestic heating it is found the commercial efficiency of the coal cooking-range is as low as between 3 and 6 per cent. (*Electrical Engineer*, March 7, 1894.)

Another investigator (*London Society of Engineers*, November 6, 1893) gives it from actual experiment as 4 per cent, and shows but 1 pound of coal in 27 is actually effective.

Hedaway says (*Electrical Engineer*, March 7, 1894) the heat efficiency of the average moderate-sized central station is about 6 per cent, and this is a sufficient margin to warrant the use of electricity as a source of heat in domestic life. This low efficiency is based on figures of no advantage to this branch of commerce, and would, of course, be improved with apparatus of proper size and planned for higher working economy where apparatus and tools are all more regularly employed.

The lamp rates, now generally prevailing, will preclude this branch, but a heat rate which will be evolved as a demand re-designs central stations will bring about this model heating. The cleanliness, regularity, convenience and healthfulness will down many of the objections to higher rates, especially in earliest stages of its introduction.

The power rates of the Edison central-station companies, with the discounts allowed to large users, is equal to 5 cents per horse-power hour. In the Electric Kitchen, in New York, on an eleven weeks' trial, at the 5-cent rate per horse-power hour, an average of ninety-seven persons were served at an average cost of 2.5 cents each for the heat.

Every form of industrial work is undergoing change in this particular.

A 7-pound electric laundry-iron requires about 330 watts for a far more efficient and economical service that can be otherwise had, that is, with the old furnace of coal or gas. In such a service more elements enter into cost or economy than are at first appreciated. In electric laundering, the continued readiness by constant temperature, avoidance of over-heated room for operators, and the all-important matters of cleanliness and safety must be considered.

I here exhibit a laundry-iron which has been torn apart for your inspection. The current passes through the coils contained within and offers such resistance that sufficient heat is generated for the work. The mechanical design is worthy of an inspection.

These are practical and are largely in use in this city and elsewhere. I have just inspected their working in a clothing-house, where, I was told, they are there to stay and more are wanted.

Another appliance meeting with popular favor is the electric glue-pot; one is here exhibited and will be admired upon inspection.

NOTE. — Wm. Mann Co. has a large battery of these in the bindery and praises their efficiency.

On the usual 110-volt incandescent-light circuit, about 2 ampères are used in heating and maintaining working conditions, being equivalent to about two glow-lamps.

Another happy combination, wherein the arc is used for an industrial tool, is found and here exhibited in the electric soldering-iron.

Through the wooden handle passes the current by flexible conductors, one side of the current reaching the soldering point by way of a central carbon rod, which is adjusted by the back screw to touch or be withdrawn from contact with the inner part of the copper tip piece, which is connected with the inner side of the current by the sheathing-tube.

This also is a practical tool. It requires 3 to 7 ampères, and on a 110-volt circuit a resistance is connected in of about 17 ohms.

Probably the greatest attention in heating, looking to personal comfort, has been given to passenger street-car work.

Here the application is greatly simplified by the presence on the car of the needed source, in the greatest convenience.

Connections on the line may be had by simply tapping it on its way to the motor and with the coils of properly regulated resistance, to develop the needed amount of heat, placed in position to interfere in no way with the seating.

Usually the space under the seats is utilized, and in some forms of heater the space below the rolled edge of the seat and on the face of the seat-front is sufficient. Others are designed to replace the panel and be suspended under the seat.

They are usually constructed to be brought to the temperature wished with about 5 to 9 ampères of current, depending, of course, on 500 volts electromotive force.

As to cost, one expert of the Edison Company has published the figures of a series of careful tests. The running expenses are from 12 cents to 18 cents per car day.

He also states for comparison that car-stoves cost 20 to 35 cents, or about double.

TWENTY-NINTH ANNUAL REPORT OF THE BOARD OF DIRECTORS, AMERICAN INSTITUTE OF ARCHITECTS.[1]

YOUR Board of Directors has held three meetings and the Executive Committee one meeting during the year.

They have received and accepted the resignations of nineteen Fellows, and have requested others to withdraw their resignations: they have opened three letter-ballots and found that you have elected seventeen new members, one of those proposed having been refused an election by eleven negative ballots. Twenty-one members have been dropped from the rolls for long continued delinquency in the payment of their dues.

The year's experience under the amended by-laws has clearly shown how difficult it is for a Committe of the Institute to formulate a scheme which in practice will prove to be satisfactory to the Fellows. For a number of years it has been considered, to quote the words of our late honored President, Richard M. Hunt, "that the strength of the Institute lies in its Chapters," and that everything possible should be done to encourage the formation of Chapters, to promote their growth and keep them in close touch with the Institute. To promote these ends, the whole question of the relation of the Chapters to the Institute was referred to a very able and representative Committee who gave the matter prolonged and careful consideration and presented to the Convention in New York last year suggestions for amendments to the by-laws, which would make them very complete and harmonious, and based upon the closest possible connection of the Institute and its Chapters, making a certain class of membership in the latter impossible for one who was not a Fellow of the Institute. The Convention adopted the proposed amendments with but little opposition, but with some misgivings, and from all quarters your Board of Directors has had communications, showing such a deep-seated opposition to the same that the Committee feel that their intent has not been fully understood, and they desire that your Board should say that their plan contemplated for all Chapters, at least four grades of membership: —

(*a*) A first grade of Practising Members.

(*b*) A second grade of Associate Practising Members (being those admitted under Section 3 of Article 10 of the by-laws).

(*c*) A third grade of Associate Members.

(*d*) A fourth grade of Junior Members.

(*e*) And other such further grades of Honorary, Corresponding, Life or other class as each Chapter may choose to create.

(*a*) The first grade, or Practising Members, should hold all the property of the Chapter, should alone be eligible for election to the offices for the government of the Chapters, should alone have power to vote as to the membership of its own grade, and should for its distinction and extra privileges pay a higher annual due than the members of any other grade, their suggestion being that they should pay double the dues of those of the second grade. Members of the first grade may or may not be Fellows of the Institute, but as many of them will have advanced to this grade from the second grade (where membership in the Institute is compulsory) they may believe that none would relinquish their membership in the Institute when they become first-grade members of Chapters.

(*b*) Those only are eligible to the second-grade membership who have conducted business, as principals, for at least three years and have been proposed and elected Fellows of the Institute, and as

[1] Submitted to the Convention at its first session, October 15, 1895.

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these men would probably be among the younger men of the profession, it was intended to place their Chapter dues so low that they would not feel it a burden to pay also their Institute dues.

Your Board would take the liberty here to suggest that the fixing the dues of this grade of members at a uniform rate of $5.00 for Chapter dues was probably the cause of the misunderstanding on the part of the Chapters, of the Committee's scheme. This sum is as large as many of the Chapters' highest dues, and is in excess of some others. Had the Committee given each Chapter the power to make the dues of this grade of Chapter members one-half of the dues of the first-grade members, it seems to the Board that the amendments adopted last year would have received the support of all who opposed them.

In considering the amendments proposed this year, your Board asks you to give due consideration to the views of the committee which formulated the report of last year, and trust that such wise action will be taken as will result in adopting by-laws which will eventuate in the best interests of the Institute without the necessity for an annual revision.

It has also been found in practice that it is very difficult to get the work of the Institute done by so large a body as twenty-nine men.

A letter-ballot was consequently sent out, with a view to making a Board of officers to manage the affairs of the Institute, to consist of the President, the Secretary, the Treasurer and four other men, but an insufficient number have voted to signify the wishes of the Fellows in this matter, and a new ballot has been ordered.

There has been an application for a charter for a Chapter, to be called the Texas State Chapter, which has been granted by the Board of Directors after a prolonged correspondence growing out of the fact that there were a number of men, not Fellows of the Institute, who also wanted to form a Chapter, and wished to be admitted in a body as Fellows of the Institute without subjecting themselves to individual letter-ballot, which it was not possible, under the by-laws, for the Board to grant.

It is not necessary for the Board to repeat the familiar history of the practical defeat of the McKaig Bill by the non-action of Congress, of the resignation of Mr. O'Rourke from the office of Supervising Architect, for reasons which reflected great credit upon his official action, of the tendering of the office to Mr. John M. Carrère, and his declining to accept it after a careful survey of its opportunities and responsibilities, handicapped as they were by want of real control, and of the selection for the position of Mr. William Martin Aiken, a Fellow of the Institute, honored and respected by all who know him.

The President has, by direction of the Board of Directors, appointed R. M. Hunt, C. F. McKim, George B. Post, Robert Stead, James G. Hill, Bruce Price, John M. Carrère, Alfred Stone, Cass Gilbert, Louis H. Sullivan, a committee to investigate and report upon the present method of designing and erecting United States Federal Buildings, and to report upon the best method of elevating to a higher standard the architecture of such buildings, with instructions to report the same to the meeting of the Board of Directors which was held yesterday, but the sickness and death of Mr. Hunt, who was named as Chairman of the Committee, has prevented a meeting of the Committee, and, therefore, the President has continued the Committee with instructions to report to the Board at its meeting in January, 1896.

At no time in the history of the Institute has the question of the ethics of the profession been as frequently and so constantly under consideration and discussion as during the last year. Your Board does not, therefore, feel that the standard of professional practice has been deteriorating and that unprofessional conduct is more in evidence than formerly, but rather that higher ideals have obtained, and lapses from professional conduct excite more notice and more opposition. Still they feel that unless checked, the competition for business among the vast and increasing number of architects will lead to a constant adoption of those practices which obtain among some contractors and those who furnish building supplies, and who, by their persistent, and, may we not say, often impertinent pushing of themselves and their wares, have made it a necessity to turn a deaf ear, even to some to whom it would be both pleasant and profitable to listen.

The adoption at the last Convention of the resolution deprecating the practice of soliciting patronage, the adopting of a Code of Ethics by the Boston Chapter, the effort on the part of your Board to discourage the practice of architects entering into arrangements by which contractors feel themselves forced to advertise themselves in an elaborate manner, with illustrations of the architect's designs; the opposition to competitions, and, where they are deemed necessary, the attempt to regulate them so that they shall be fairly conducted and so that they shall be paid for by those who are alone benefited, if, indeed, they are benefited by them, all show an improved tone in the profession, but, on the other hand, they all testify to the prevalence of unprofessional methods, which would be condemned if they were practised by lawyers, physicians or clergymen.

There have been efforts made in three States, New York, Illinois and California, to have laws passed for licensing architects, and while there has been a general assent, if not open advocacy of the passage of such laws, they have not been unanimously supported by the best men in the profession, and there is a strong and growing sentiment that the Institute should endeavor to adopt a plan of examination somewhat after the manner of the Royal Institute of British Architects, in order that membership in the Institute should of itself be more conclusive evidence than it now is of worthiness to practise architecture.

The delay in issuing the Proceedings of the Twenty-eighth Convention was owing, first, to the unwillingness of the Board to begin to contract bills for printing until there was enough in the Treasury to pay the bills, and also to the enforced postponement of Institute work, because of the death of one to whom your Secretary owed those duties which cannot be put aside, and it has occurred to him that it would be well to print, after the manner of the Royal Institute of British Architects, six numbers during the year, which would contain not alone the Proceedings of the Annual Convention, but the doings of the Board of Directors, and that of the several Chapters, if they would furnish them to the Secretary.

There have been but three deaths of Fellows of the Institute, and as far as your Secretary is aware, of but one Honorary Member, the Hon. William Jones Hoppin, of Providence, R. I., who died at his residence in that city, on September 3. He was for many years Secretary of Legation to London, and was well known for his love of architecture and the other fine arts.

The death of James Renwick, on June 23, and of our beloved Ex-President, Richard Morris Hunt, on July 21, removed two of the leading men in the profession in New York. The former was more widely known away from his native city as the designer of Grace Church and St. Patrick's Cathedral; the other has long been identified with the Institute and was for many years an officer of the same, serving two years (the constitutional limit) as its President. The Board of Directors, of which he was a member at the time of his death, has passed proper resolutions to his memory, which will be engrossed upon its records; and arrangements have been made for a memorial meeting which will be held on Tuesday evening, and Mr. Henry Van Brunt, a Fellow of the Institute has been selected as the orator for the occasion.

Mr. H. G. Isaacs, one of the oldest practitioners in this city, died at Montreal, on August 8.

ANNUAL ADDRESS OF THE PRESIDENT OF THE AMERICAN INSTITUTE OF ARCHITECTS.

Fellows of the Institute in Convention assembled: —

I congratulate you on assembling in this noble city. Hospitality seems to be especially at home here in St. Louis. Her hand is ever gracefully extended and is ever most pleasant to the grasp, when once she opens her door to a worthy guest, as she has done in your case to-day.

Our present membership is 454. Of those Fellows who have been forever removed from our earthly vision, Richard Morris Hunt ranks first. When the door of the future opened and let this giant stalk through we almost heard the shout of welcome from the mighty masters who had gone before him. They must have recognized at once his right to a place among them by his lofty bearing and the noble aspect of his countenance. May he breathe upon our souls that pure knowledge of law which he is now enjoying, that through us the men who follow us may be enlightened.

There has been no change during the year in the attitude of the United States Government towards the architects of the country. The provisions of the Tarsney Bill, by which all the buildings may be designed through a competition of architects, lie dormant. This is because the Secretary of the Treasury still holds that he cannot proceed under that bill until after a clause in an enactment of 1875 shall have been repealed, which clause, as you may remember, is to the effect that no Government Building shall be commenced until after the design for it shall have been previously made by the Supervising Architect of the Treasury. Last spring, Congress appropriated $4,000,000 for a new Chicago Post-office Building, $30,000 of which was for draughtsmanship and expert services. Under that act the Secretary of the Treasury is reported to have established a department in the Supervising Architect's office called the "Chicago Department." It is also said that the Secretary will employ a Chicago practitioner to make the design for the building I have mentioned, but it is understood that the architect must go to Washington as an assistant to the Supervising Architect, and that he must be paid for his services out of the $30,000, such portion of that sum being used for his salary as may not be necessary for draughtsmanship and expert service. This would seem to require the architect to sacrifice his residence and his time for little else than glory. The precedent once established would probably be followed by the Government of the United States, and thereafter Government work would not be placed in the hands of an architect unless he were willing to neglect his private practice, and do it practically without compensation. If the National Government adopts this method, will not States, counties and cities follow? Even if it stops with the Government, I fear the result will be injurious to the architects and to the architecture of the country.

The practice of architecture has been rapidly improving during the past few years. This is true in the design and in the execution of work. It is due to increasing knowledge and the better training of the architects themselves. Not only are the schools and opportunities for study increasing, but a higher class of men are coming forward in the profession itself. Our own schools throughout the country are educating architectural assistants who have a better

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training than was wont to be the case. Beside this, the foreign schools are doing much for our American youths. I am informed that until this year the French school has never issued its full diploma to an American, though many of our countrymen have been under its tutelage. It is, therefore, a fact worth mentioning, that two Americans, John Van Pelt and Herbert Hale, have taken the full diploma of the French School of Fine Arts. Surely, it cannot be claimed that originality and imagination will be dwarfed by a training in the knowledge of fundamental laws, the observance of which lies at the bottom of all good architecture. We ought to rejoice over the schools of architecture because the teachers in them are becoming more skilful, and because so many of our eager, talented American youths are at work in them. A most notable fact, involving great benefit to our profession, is the recent establishment in Rome of a school for the study of the Classics. It is intended for those who have already become proficient in the application of fundamental principles of architecture. It has only been in operation about one year, but has already accomplished valuable work. The promise of architecture for the twentieth century is hopeful.

The need of a home for the Institute is growing. At no distant day we should possess permanent fireproof quarters, where may be gathered our own records and those sent to us by learned societies of the world, also the portraits of our distinguished dead, and, what is of still greater value, the writings and drawings made by their hands. These can be gathered now, and the records of the Fellows who have passed away may be made quite complete. A fund to buy a lot and to place thereon a fireproof building, should be started at once, and I recommend that steps be taken to this end. Into such a National Building might be gathered many highly valuable documents and designs left by the distinguished Fellows of this Institute who have passed away during the past twenty years. A family without a home does not gain from the community the consideration which is its due; and the Institute will not possess its full and proper influence until its meetings shall be held under its own roof, where traditions of its noble dead shall surround its living members. Let us have an abiding place where the tablets that speak of the works of our brothers shall invite us to emulate their labors.

The policy of compelling members of the Institute to remain members of a Chapter has been tried long enough to give it a fair test. It seems to me that it has not proven satisfactory. Has not the time come to change it? It appears evident that the rule we have been trying to observe, namely, that Chapters may not overlap each other, is impracticable and should be abolished. I can see no good reason why two or more Chapters should not be formed in the same territory. It is quite possible that some of our Fellows will, in the future, desire to form themselves into a Chapter for the purpose of furthering Fine Art alone, and there may be others who will have quite different ends in view. Should not each be allowed to organize a Chapter? Will not the Institute be benefited thereby?

I thank you for your attention.

BOOKS AND PAPERS

To the numerous works already extant on art, Professor Van Dyke has added a "*History of Painting*" [1] which, while not claiming to be more than a text-book for colleges, and, therefore, necessarily abbreviated, may be set down as one of the most valuable yet produced. It is comprehensive, well arranged and up to date, including living painters and American artists. Moreover, it is correct in its facts and sound in its judgments, with but few exceptions, and it is well illustrated.

The pictures, indeed, deserve special mention for their excellent quality and the good judgment shown in their choosing. We must, however, except the "Helen of Troy," given to represent Sir Frederic Leighton, as it is far from being one of his best works. Nor is the tawdry "Wise and Foolish Virgins," which we are sorry to hear has been presented to the Yale Fine-Arts Gallery, a fair specimen of Piloty's powers. His "Dead Wallenstein," or the "Thusnelda," would have been much better.

Other good features are the lists of "Books Recommended," and of the principal works of the chief painters, with their whereabouts, and a full index.

We notice a few errors and omissions, as in the absence of Decamps and Gabriel Max, and of the date of the death of Albert Moore (deceased 1893). Callcott is spelled "Calcott"; Blommers is spelled "Bloomers," and Lhermitte is printed "L'Hermitte." An important addition to the lists of authorities given would be Bellier de la Chavignerie and Auvray's monumental "*Dictionnaire Général des Artistes de L'école Française*," with which the author is probably acquainted.

Barring these slight blemishes, it is very seldom that we find so much value in a reference-book of less than three hundred pages.

[1] "*A Text-book of the History of Painting*," by John C. Van Dyke. Longmans, Green & Co., New York and London. Price, $1.50.

If it were true, as Hogarth says, that genius is nothing but labor and diligence, then the compiler of a work, like the one under review, must possess a liberal portion of the divine gift. Few people, probably, realize the patient industry required in making a reference-book, but on this subject we can speak with the knowledge born of some experience, and easily recall occasions when many hours of steady work have been expended in the search for a reliable date or the proper spelling of a name.

In "*Schools and Masters of Sculpture*," [2] Miss Radcliffe has endeavored to give a complete, though perforce condensed, history of the art and its practisers and has reached a high degree of success.

Beginning with Egypt, the cradle of all art, the author leads us through Assyria, China, Japan, India, Persia, Phœnicia and Cyprus to Greece, to whose wondrous plastic treasures full justice is done. Then comes Roman and early Christian sculpture and a chapter devoted to mediæval work brings us to the Italian masters of the Renaissance. From them, we turn to the consideration of French, German and English sculpture, and next to the productions of European and American sculptors in general in our own day. The concluding portions of the work deal with the study of sculpture in the rich museums of the Old World and in our own much scantier but growing collections.

The book is made more useful by the addition of a bibliography of sculpture, and a copious index, and is well printed from clear type and embellished with a number of good reproductions of famous sculptures. Among these it is strange not to find the "Venus of Milo," an omission in favor of lesser works which most readers, we think, will scarcely approve, and we miss also an illustration of one of the superb Greek bronzes, such as the headless youth from the Sabouroff collection, now in Berlin, or something from the matchless collection at Naples. Surely their absence is not atoned for by the representations of the youthful Nero and the Meleager of the Vatican.

Reverting to the text, we deprecate the scant praise given to such a master as Fremiet, and note a few inaccuracies, as where the author speaks of Dalou's *marble* relief of the "Meeting of the States-General," which is of bronze, but gladly leave the ungracious task of pointing out such slight imperfections in so excellent a work as this.

[2] "*Schools and Masters of Sculpture*," by A. G. Radcliffe. D. Appleton & Co., New York. Price, $3.00.

THE ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE SMOKING-ROOM: THE BALTIMORE CLUB-HOUSE, BALTIMORE, MD. MESSRS. J. A. & W. T. WILSON, ARCHITECTS, BALTIMORE, MD.

[Gelatine Print issued with the International and Imperial Editions only.]

PLANS OF THE SAME BUILDING.

COMPETITIVE DESIGN FOR THE MINNESOTA STATE-HOUSE, SUBMITTED IN THE FIRST COMPETITION BY MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

THIS design was awarded second place by the experts. The Capitol Commission, however, would not accept this part of the report, but denied it a place amongst the five designs to which the prizes were finally awarded.

SKETCH FOR DINING-ROOM MANTEL IN HOUSE OF JOHN E. DEVLIN, ESQ., BOSTON, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.

PANDOLFINI PALACE, FLORENCE, ITALY. DRAWN BY MR. W. H. ORCHARD.

THIS building, designed by Raphael for his friend Giannozzo Pandolfini, Bishop of Troja, was not completed, owing to various interruptions, until 1620, a hundred years after the great artist's death. Its construction was at first superintended by Gian Francesco da San Gallo and afterwards by Aristotele da San Gallo.

[Additional Illustrations in the International Edition.]

BALTIMORE CLUB-HOUSE, BALTIMORE, MD. MESSRS. J. A. & W. T. WILSON, ARCHITECTS, BALTIMORE, MD.

[Gelatine Print.]

THE Baltimore Club-house occupies a lot 34 feet wide, with a space about 6 feet wide on the north for light. The lot has a grade,

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which carries the ground about 5 feet higher at the rear of the building than at the front. The exterior is of specially made red brick 16 inches long, with moulded brick around the double and triple windows, and moulded brick mullions. The dormer is of copper; roofs of dark-brown glazed tiles. The first story and basement, with sills and lintels of upper windows, are of Manassas red sandstone. The doors are of oak, with massive hinges, grilles and lock-plates of hammered iron. The interior is mostly finished in cherry and in quartered-oak. The cost of the building, without furnishing, was about $25,000.

TWO CHIMNEYPIECES IN THE (SO-CALLED) HOTEL SULLY, CHATELLERAULT, FRANCE. RESTORED BY M. DEVERIN, ARCHITECT.

[Copper-plate Photogravure.]

CANADIAN CONFERENCE ROOM IN THE IMPERIAL INSTITUTE, LONDON, ENG. MR. T. E. COLLCUTT, ARCHITECT.

AUSTRALIAN CONFERENCE ROOM IN THE SAME.

GENERAL SCHEME FOR THE UNIVERSAL EXHIBITION OF 1900, PARIS, FRANCE: BIRD'S-EYE VIEW.

PLAN OF THE SAME.

See Paris letter in this issue.

EXHIBITIONS

Boston, Mass.— *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opened October 14.

Chicago, Ill.— *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

Cincinnati, O.— *Fifth Annual Exhibition of the Cincinnati Art Club:* at Closson's Gallery, October 21 to November 2.

New York, N. Y.— *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice," also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Portraits of Bismarck by Walter Petersen: at Knoedler's Galleries.

St. Louis, Mo.— *Art Exhibition at the Exposition, including Special Collection of "Pictures of the Glasgow School."*

Inter-Club Exhibition of the St. Louis Architectural Club: at the Museum of Fine Arts, opened October 15.

NOTES AND CLIPPINGS

The Simplon Tunnel. — The tunneling of the Simplon will be commenced early next year. The first plans for this undertaking date from 1890, from the chief-engineer of the Jura-Simplon Railway Company, Mr. Dunnow; they were, however, materially altered a couple of years afterwards, by a Hamburg engineering firm, and the final plan is the outcome of coöperation between several experts. There will be two parallel tunnels, each about 66,000 feet long, the distance between the two tunnels being 57 feet, and at every 670 feet the two tunnels will be connected with each other. The one tunnel will be completed first, whilst the other will serve for ventilation, and will probably not be completed till the traffic makes it necessary. The arrangement of the two tunnels has, to a great extent, been adopted so as to be able to bring about efficient ventilation and reduce the temperature. According to calculations, the temperature at the point farthest distant from the surface will be some 102° to 104° Fahr. During the construction of the St. Gothard tunnel the temperature, on account of deficient ventilation, at times reached 99° Fahr. The ventilation was effected by means of compressed air, which was conveyed into the tunnel through metal pipes, and which was used for driving the various boring machines prior to serving for ventilating purposes. The dimensions of these pipes were of necessity small, and only about 70 cubic feet of air could be conveyed into the St. Gothard Tunnel every second. By means of the second tunnel, which, as mentioned, in the meantime will only be used for ventilation, some 1,800 cubic feet of fresh air can every second be conveyed into the Simplon Tunnel, whereby the temperature can be brought down to 77° Fahr. — a great boon for the workmen and, later on, the passengers. The auxiliary tunnel may also prove useful for the transport of material, etc., for the principal tunnel. It is expected that the Simplon Tunnel can be completed in the course of five years and a half, or in three years' less time than the St. Gothard Tunnel, although the latter is some 15,000 feet shorter than the former, the Mont Cenis Tunnel being again some 6,000 feet shorter than the St. Gothard. The fact that the Simplon Tunnel will be at a level about 1,500 feet lower than the two others, is also a point in its favor, and although the first cost will be heavy, the working expenses are expected to be considerably less. The cost is calculated at 54½ million francs, or about 2,180,000*l.* — *Engineering.*

The Building of Saint Sophia. — Materials were brought from far and near, Egypt and Greece uniting with Asia Minor and the islands, each contiguous to the capital, in supplying their quota of marble for the columns and walls. For nearly six years the works went on with unabated energy; many difficulties were overcome, and many experiments were tried and found successful, and at length, on the 26th of December, 537, the church was dedicated amid the acclamations of the populace, and the Emperor exclaimed in the fulness of his pride: "Glory be to God, Who hath thought me worthy to accomplish so great a work. I have vanquished thee, O Solomon!" The Emperor's joy in his church was, however, destined to receive a rude shock some twenty years later, when the apse and part of the dome were thrown down by an earthquake; but the same energy which was shown in the building of the church again asserted itself. The damage was repaired — the dome being heightened twenty feet to give it additional security — and the church was reconsecrated on the 24th of December, 563, five and a half years after the disaster. The Church of Saint Sophia has never been surpassed in the unity and completeness of its design, and in the daring nature of its construction. In this building the arch and dome assert themselves and dominate everything, and we have a lightness, a spaciousness and a grandeur that had never been reached in the finest of the basilicas, and has never been surpassed since. During all the centuries which have elapsed since its erection, it has maintained its supremacy as the masterpiece of Byzantine architecture and construction, and it fixed generally the type on which most of the later churches in the East were based, but it has never been surpassed by any of them. — *Scottish Review.*

Paper Pulp for Leaks. — Paper pulp is one of the most useful articles in the reach of mankind. Mixed with glue and plaster-of-Paris or Portland cement, it is the best thing to stop cracks and breaks in wood. Pulp paper and plaster alone should be kept within the reach of every housekeeper. The pulp must be kept in a close-stoppered bottle, in order that the moisture may not evaporate. When required for use, make it of the consistency of thin gruel with hot water, add plaster-of-Paris to make it slightly pasty, and use it at once. For leakage around pipes, to stop the overflow of water in stationary washstands, where the bowl and the upper slab join, it is invaluable. Used with care, it will stop leaks in iron pipes, provided the water can be shut off long enough to allow it to set. Around the empty pipe wrap a single thickness or two of cheese-cloth just wide enough to cover the break, then apply the compound, pressing it in place and making an oval of it somewhat after the fashion of lead-pipe joining, only larger. The strength of this paste, when once it is thoroughly hardened, is almost beyond belief. The bit of cheese-cloth prevents the clogging of the pipe by the paste working through the cracks. An iron pipe that supplies the household with water had a piece broken out by freezing. The piece was put in place, bound by a strap of muslin, then thoroughly packed with paper pulp and Portland cement, and was to all appearances as good as new. Paper pulp and fine sawdust boiled together for hours, and mixed with glue dissolved in linseed oil, makes a perfect filling for cracks in floors. It may be put on and left until partly dry, then covered with paraffine and smoothed with a hot iron. — *Rural Mechanic.*

The Walls of Avignon. — There is no city in Europe which gains so much character from its fortified wall as Avignon. In the eyes of a military engineer the old masonry, if compared with the defences of such a place as Lille, appears as worthless as a cardboard enclosure. But when Avignon was a refuge for the popes there was no other place that was more secure. It now suggests to the tourist the strength of the enemies who pursued popes and anti-popes for more than a century. The walls are wonderfully preserved. They have now to withstand enemies of a novel kind, for the municipal council have come to the conclusion that they are obstacles to public improvement. At first it was proposed to deal only with one of the watch-towers of Clement VI. The Commission of Historic Monuments interfered, whereupon the councillors decided upon a wholesale destruction of the ancient fortifications. It cannot be denied that Avignon is no stronger from its fourteenth-century walls; but if the municipal councillors are permitted to have their own way the city will be infinitely less attractive, for it obtains its peculiar character from the vast and grim palace of the popes and the walls, of which the picturesqueness has been enhanced by years. — *The Architect.*

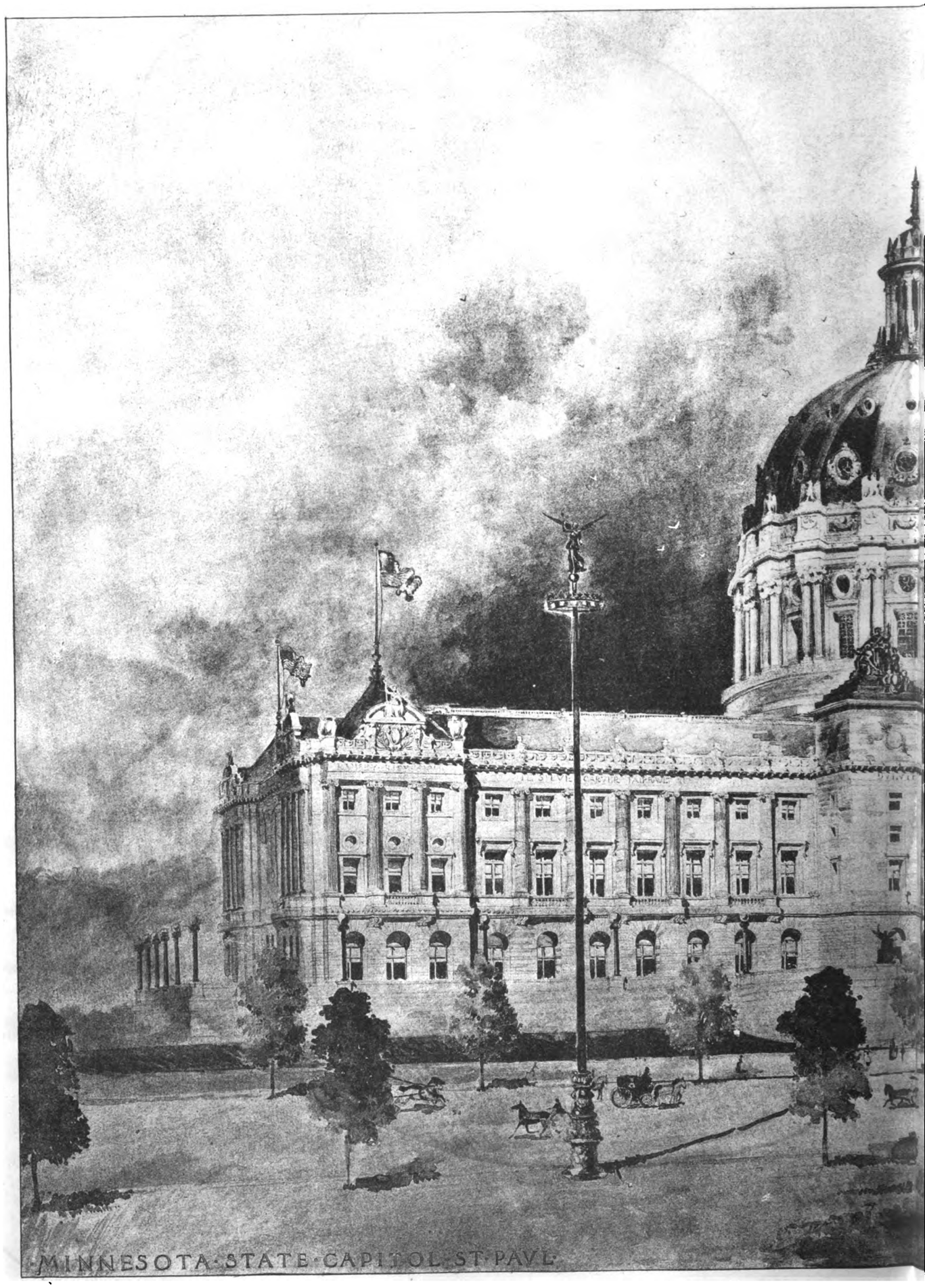
Molybdenum, an Interesting Metal. — In Paris, M. Moissan has recently succeeded in preparing fairly large masses of pure molybdenum. The metal thus obtained has a specific-gravity of 9, and is only fused with difficulty. The pure metal is quite as soft and as malleable as wrought-iron, and can be easily forged at a red heat. It can be preserved without oxidation under water for several days. The most remarkable property of the metal is, however, the fact that it can be cemented like wrought-iron, forming a "steel," if the term may be used, which can be tempered similarly to ordinary steel. Moreover, cast molybdenum containing several per cent of carbon can be softened by placing it in a mass of oxide of the metal, just as in the ordinary process of making malleable castings. Having a very great affinity for oxygen, M. Moissan suggests that it may be usefully added to the iron in a converter, replacing manganese or aluminium. As the oxide of the metal is volatile, it does not remain in the converter. — *Engineering and Mining Journal.*

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DESIGN FOR MINNESOTA STATE-HOUSE SU

J. A. SCHWEIN

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THE ARCHITECT & BUILDING NEWS CO.



HALFTONE PRINTING CO. BOSTON

SUBMITTED IN THE FIRST COMPETITION.

NFURTH, Architect.

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SKETCH OF DINING ROOM MANTEL
HOUSE FOR JOHN E. DEVLIN ESQ.
WHEELWRIGHT & HAVEN; ARCH'TS BOSTON MASS

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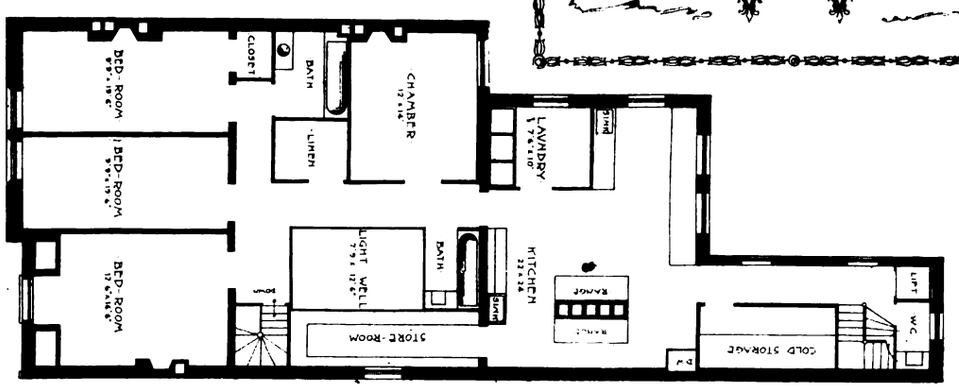
THE BALTIMORE CLUB

NORTH CHARLES STREET

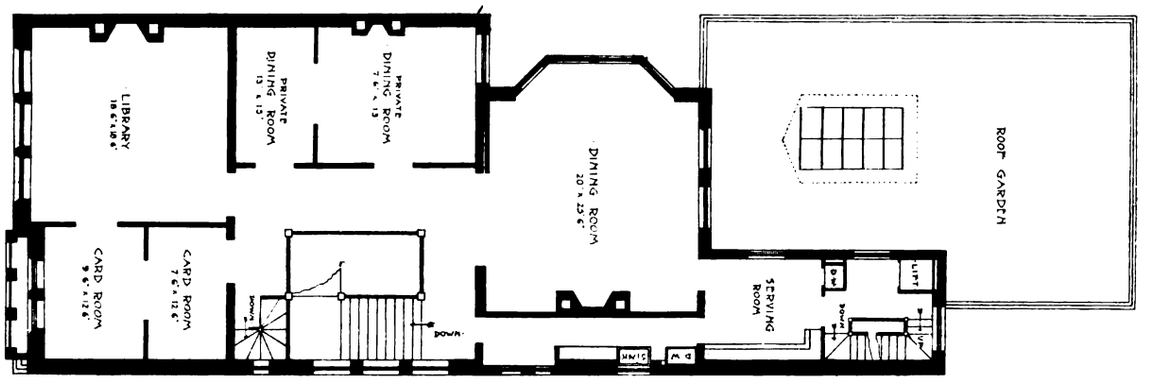
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J.A. & W.T. WILSON

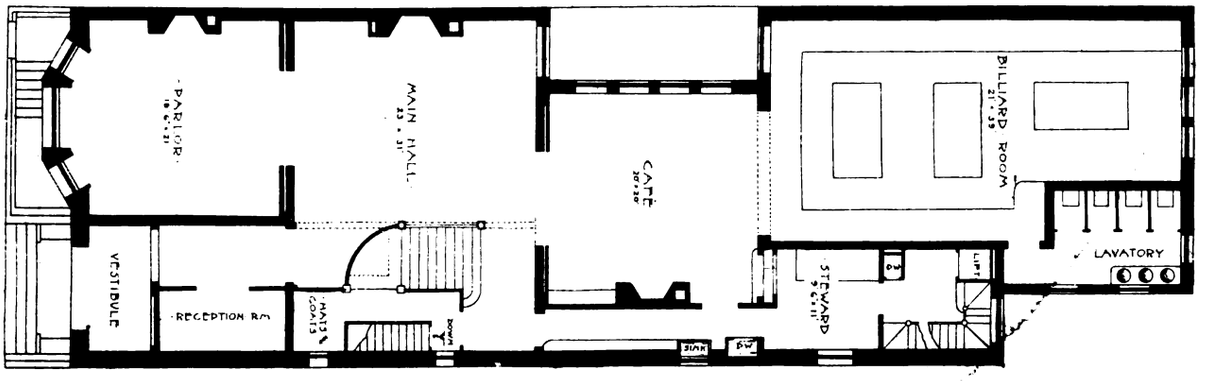
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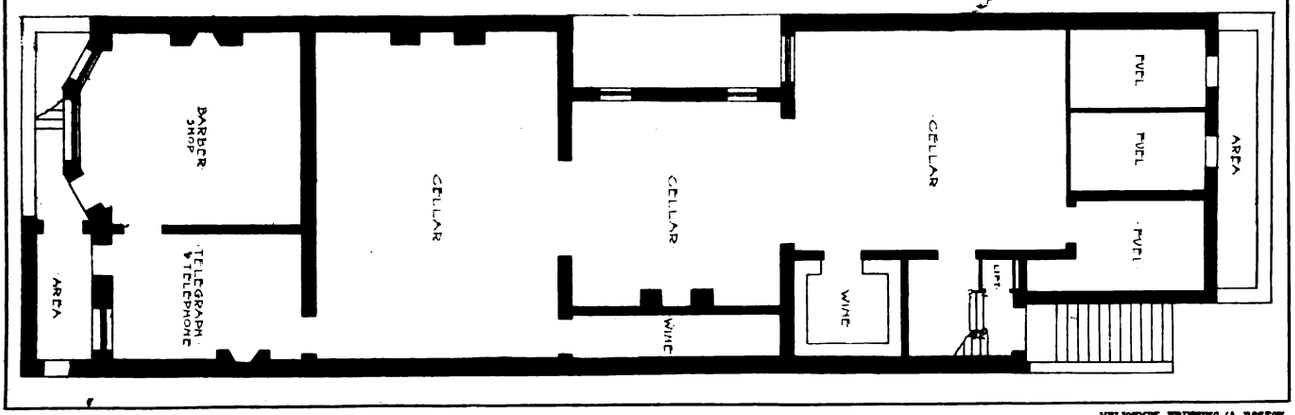


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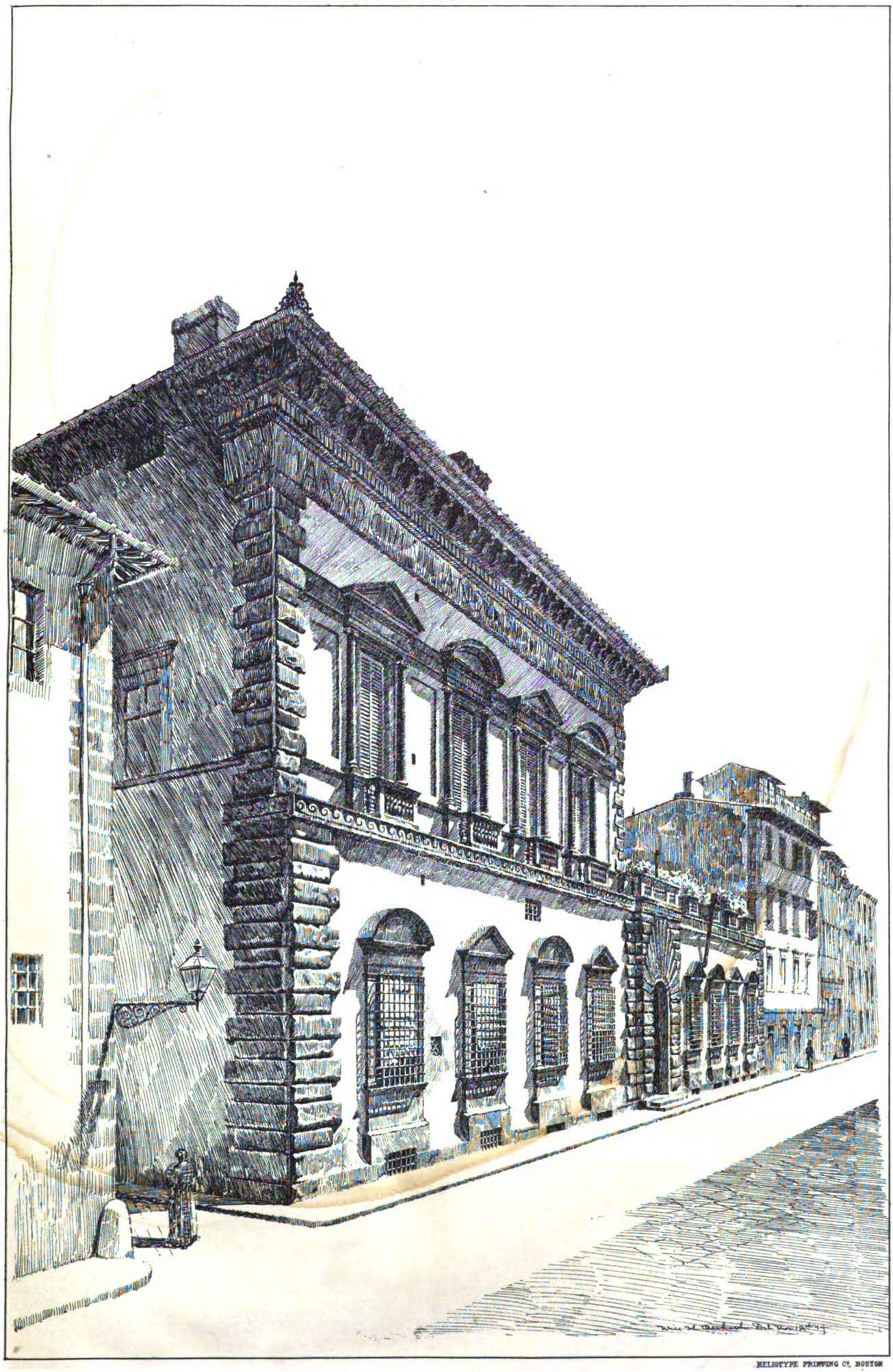


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PANDOLFINI PALACE, FLORENCE, ITALY.

Drawn by W. H. ORCHARD.

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OCTOBER 26, 1895.

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SOME lover of country life has been proposing in the Boston papers, apparently quite seriously, that the Public Garden should be remodelled, in such a way as to do away with the "expensive gardeners," and substitute for the present flower-beds and smooth lawns "a gray old house, innocent of paint for half a century," accompanied by a "barn with sagging doors, and a shed or two," placed in a "dooryard," overgrown with "goosegrass" and "red-top, dandelions, buttercups and yarrow," with "pigweed and burdocks near the barn," and "catnip by the back door." Outside of the "dooryard," the garden is to be divided by fences, "brought from some abandoned old-time homestead," with here and there "a lichen-covered tumble-down wall"; and the spaces so separated are to be devoted to the cultivation of "beets, pumpkins, cabbages and corn," under the supervision of a "nice old-fashioned farmer, with overalls, and gray beard round under his chin," who is to bring with him some "barnyard fowl," to catch "the public grasshoppers and angle-worms"; while the city is to furnish "a cow or two," to "occupy the stanchions in the barn," and "a few little pink and white pigs." To add to the attractions of this establishment in the eyes of the tax-payers, the author of the scheme proposes to furnish the "nice old-fashioned farmer" with "an old red ox-cart" and a wheel-barrow, by means of which he is to convey his surplus pumpkins and cabbages up and down Commonwealth Avenue, and "sell them directly to the fine Back Bay ladies, without the intervention of any profit-devouring middle-man."

ALTHOUGH this picture is not only purposely overdrawn, but is described with a sentimental affectation which is rather disagreeable, there is in it a certain amount of true artistic feeling. Of course, the idea of keeping up a farm in the middle of the city, where anything edible should be grown, is preposterous, for the simple reason that it would be plundered every night, as long as anything eatable remained; and it must be remembered that a dilapidated farm-house in the country, contrasting with the delicate freshness of the vegetation about it, is, æsthetically, a very different affair from the same structure in the middle of a city, blackened with smoke and dust, and surrounded only by such weeds as are hardy enough to survive the attacks of the vermin by which they are mangled, and the dust with which they are covered; but it is certainly possible in the Public Garden to obtain artistic landscape effects which are not now even thought of. Considering that the Garden is surrounded by straight-lined streets and buildings, the most elementary principles of landscape gardening require formal planting in the portions nearest the streets; but, with this to afford a proper transition, the inner part of the garden might be treated as a piece of rural nature, perhaps with great advantage, using simple wall-surfaces to heighten the picturesque effect; and a true artist could use such materials in a way to excite very pleasurable feelings. We once heard the late Francis L. Lee explain why he planted some common birch-trees near a costly country-house. The dining-room of the house had a rather gloomy outlook, toward the north. As Colonel Lee said, it made the people unhappy to stay in the room, and he had to do something to cheer them up, so he had some young birch-trees set out opposite the windows. Every one who is familiar with the bright, sunny appearance of a clump of birches can understand the thought of the artist in using them, and the unlimited resources of palette, so to speak, available for those who know how to connect natural forms and colors with human sentiments. There is perhaps no place better suited for the production of a piece of what we might call pure landscape *genre* work than the Boston Public Garden, and it is not impossible that the experiment may some time be tried.

M. RAYMOND DALY writes for *La Semaine du Batîment* an admirable notice of the late Richard M. Hunt. As Mr. Hunt and his family had been for many years personal friends of the Daly family, and the younger Hunt was a comrade of Raymond and Marcel Daly at the School of Fine Arts, the notice is written with an exceptional knowledge of its subject, and it mentions circumstances which will be new to most American readers. Among other things, it appears that the New York draughtsmen's tradition, that Mr. Hunt designed a part of the new building connecting the Louvre and the Tuileries, is substantially correct. On his return from the long journey in Greece, Asia-Minor and Egypt, which he undertook after leaving the School of Fine-Arts, his master, Lefuel, who had meanwhile been appointed, on the death of Visconti, architect of the Tuileries and the Louvre, procured for him an Imperial appointment as "*inspecteur des travaux*" on the additions which were being made to the buildings. Although appointed by the Government, he worked, of course, under Lefuel's direction, and the latter confided to him the task of studying the details of the Pavillon de la Bibliothèque, opposite the Palais Royal, which was afterwards carried out under his supervision.

ALL those Americans who are interested in the material welfare of their country will watch with interest what Mr. George W. Vanderbilt is doing on his North Carolina estate. Mr. Vanderbilt, as is well known, is making on his estate a sort of model forest, where scientific forestry is to be practised, and experiments made in acclimating valuable foreign trees, and in the most profitable management of the native species; but every one does not know that his plan includes horticulture and agriculture as well as forestry, and that he wishes and hopes to make his experience valuable to American farmers and land-owners everywhere. With this view, he proposes to build on his property a little village, including not only a hotel, but houses and stores, where people interested in agriculture, who come properly introduced, may rent rooms or houses for themselves and their families, for such time as they may desire to study the work going on upon the estate. There can be no doubt that there will be plenty of applicants, for nowhere else in this country can such opportunities for advanced study of the sort be found. Fortunately for his countrymen, Mr. Vanderbilt is not only able, but willing, to expend large sums of money in experiments which may return, for the present, nothing but advances in scientific knowledge; and it is just these experiments which are, perhaps, in the end, most valuable to the country.

A LARGE number of defects are said to have been discovered in the cast-iron columns in the new City Hall, at St. Louis, in the shape of blow-holes of alarming size, which, as it appears, were concealed with putty and cement when the columns were delivered. The experts who have been consulted in regard to the trouble think that the building will not be safe for use until many of the columns have been

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replaced by new ones. It is certainly better to discover the flaws now, than to have them reveal themselves by a sudden break-down some years hence; but one cannot help thinking that it would have been better still to have detected them before the columns were put into the building; or, best of all, to have contracted for the cast-iron work with some one who would never have furnished such fraudulent and dangerous material. It is curious that, in this country, the most foolish planning, miserable design, ridiculous construction, and wretched material and workmanship are usually found in public buildings. Even where the design and plan are good, the construction is very apt to be confided to some one with political influence, or to some member or friend of the little coterie which, in all our great cities, usually carries on the government; and the favored individual, who is likely to receive the contract because he needs the money, does his best to make all the profit that he can out of it. It will be remembered that, a few years ago, an important public building fell, by the collapse of the iron columns; and it was found, on inquiry, that the contract for them had been given to a friend of the ruling group, who carried on a blacksmith's shop somewhere in the country; and that this individual, not being possessed of means for casting a whole column at once, had set up his mould, and poured in the melted iron by small doses, until the mould was full. As each ladle-full of iron cooled before the next was melted, the columns thus consisted of irregular rings, kept together in the most insecure manner; and under the influence of a strain, they soon parted company altogether. Whether the St. Louis defects were due to the selection, by favoritism, of an incompetent contractor for the ironwork, we cannot, of course, say; but it will do no harm to have the matter fully investigated.

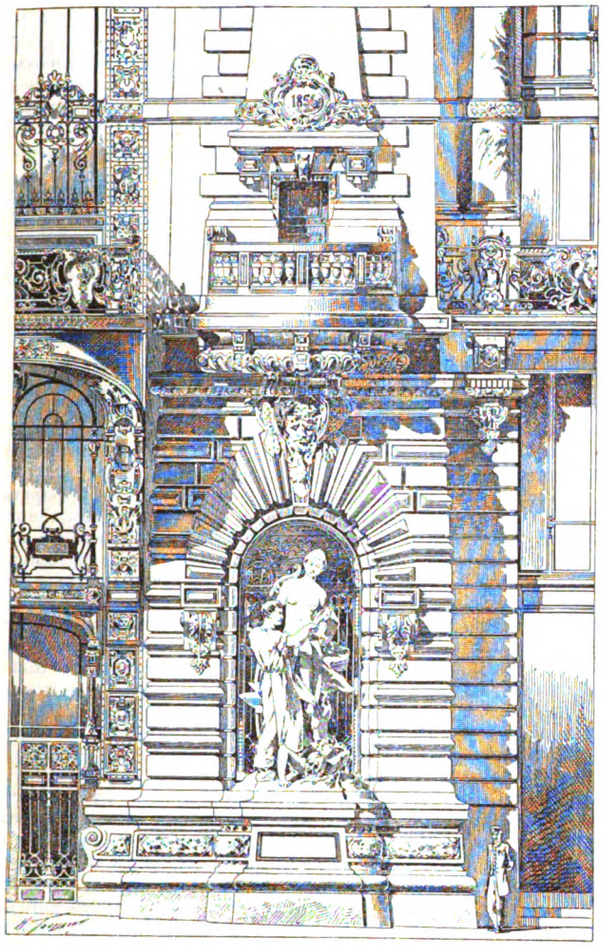
WE had occasion, a week or two ago, to speak of the laws which, in most European countries, impose upon the owner of a building presenting unusual risk from fire the burden of paying the extra premiums for insurance which his neighbors have to pay on account of the additional risk to which their buildings are exposed by the vicinity of his; and to comment upon the immense influence which would be exerted in favor of more substantial methods of construction by the adoption of a similar principle into our own jurisprudence. A case recently decided by the French Court of Appeals, in which this point was involved, will perhaps serve as a good illustration of the way in which the law is understood and applied in France. A certain Péquart erected a factory, of what sort we are not informed, in the manufacturing city of Epinal. One of his neighbors, named Brénière, who carried on a dance-hall and drinking-saloon, sued Péquart for damages, alleging that the noise and shaking proceeding from the factory injured the value of his property, and that he had been obliged to pay an increased rate of insurance on account of the erection of the new building. The judgment of the Court below, that he was not entitled to any damages, on account of the noise or vibration of Péquart's factory, but that Péquart must pay the increased cost of insuring Brénière's premises against fire, was fully confirmed by the Court of Appeal, which said that the expert examination, carefully conducted by the Court below by an architect of unquestioned competence and honesty, had shown that Péquart's factory was not the cause of any extraordinary noise or vibration, and that Brénière, in setting up his establishment in a quarter principally devoted to manufacturing, must be assumed to have subjected himself voluntarily to the ordinary risks of disturbance incident to such a location; while his own business was attended with considerable disturbance to his neighbors, particularly at night. For these reasons the Court agreed with the expert, that, in regard to noise or vibration, Brénière suffered no injury from Péquart, and had no claim for damages.

IN the matter of the insurance, the Court came to a different conclusion. It was shown that, before the erection of Péquart's factory, Brénière was paying 100.20 francs a year for insurance, under a policy issued by the Phénix Company; that, on the expiration of the policy, the Phénix Company refused to issue a new policy, except at an annual premium of 680.50 francs, giving as a reason for their action the increased risk of fire caused by the erection of Péquart's factory in the neighborhood; and Brénière, not being disposed, as the Court said, "to submit to such pretensions," found another Company, the Nation, which issued to him a policy, for an annual premium of 220.55 francs. "It was certain," the Court said, "that this increase in premium was due to the proximity of the Péquart establishment, in which, notwithstanding such precautions as might be taken, the risk of fire was serious and permanent; that this increase was such as could not be considered as an obligation resulting from neighborhood under ordinary conditions; that it constituted, on the contrary, a cause of damage for which Péquart ought to be declared responsible; that it was thus established that every year Brénière was obliged to pay, through the conduct of his neighbor, the sum of 120.25 francs, which he would not pay if the Péquart establishment had not been set up near his house; that this constituted a certain and actual damage, for which he ought to be indemnified by the defendant"; and it held, in confirmation of the judgment of the Court below, that Péquart must pay the difference between the insurance premiums actually paid by Brénière, and the premium which he paid before the Péquart factory was built.

M. DIEULAFOY, the noted explorer of the ruins of Susa, recently took part in an interesting discussion on the origin of Mycenæan art. According to *La Semaine du Batîment*, which has followed the discussion with care, M. Dieulafoy believes that the art of Mycenæ was derived partly from Phœnicia, and partly from Egypt, with an indirect influence from Chaldea, and a considerable original element. In matters of ornament, as he says, Egypt preponderates. The rosettes, palmettes, meanders and spirals are directly copied from Egyptian work; so that, as he says, the ceiling decoration of a room at Orchomenos might have been discovered in a tomb at Thebes without causing surprise. The sculpture of Mycenæ and Argolis, on the contrary, suggests Chaldea. A silver vase of this period, on which is represented a siege, shows the terraced architecture, the costumes, and even the characteristic foliage, of the valleys of the Tigris and Euphrates; and several Mycenæan sculptured slabs are in existence, which the most skilful archæologist would be unable to distinguish with certainty from Chaldean work. Nevertheless, such striking differences exist beside these equally striking analogies as to suggest the action of a powerful foreign influence, acting upon a race originally distinct, but becoming constantly more and more assimilated with the strangers. As a confirmation of his theory of the modification of a native race by Asiatic and Egyptian communications, M. Dieulafoy points out that the very physical characteristics of the race were altered, and that from blonde they became brunette, by the admixture, undoubtedly, of African and Oriental blood from Egypt and Asia. In proof of this, he cites a passage of Herodotus, in which it is related that, according to the legend, in very ancient time, when Greece was still called Pelasgia, a black dove alighted on an oak-tree at Dodona, and inspired it with its cooing, so that thenceforth the tree talked in soft whispers, revealing to the faithful the oracles of Zeus. Herodotus explains the legend by saying that it referred to the entrance into the community of an Egyptian woman with dark hair and complexion, whose strange speech was compared by the poetical Pelasgians to the cooing of a black dove. Later, the "black doves" became numerous in Pelasgia, and other broods were undoubtedly introduced, as the existing artistic remains show, from Phœnicia and Chaldea, so that, very much as is at this moment the case in our own country, the blonde type began to be the exception, instead of the rule. In Pelasgia, also, the fair complexion came to be regarded as an evidence of pure Hellenic blood, just as in this country we distinguish the descendants of the Puritans, in a general way, from the North German, and Celtic, and Latin elements, by their blue eyes and light hair. At the time of Homer, the pure blonde type had become hardly more than a memory, but it was a cherished memory, and all the gods and heroes of the legendary age of which Homer sings are described as "golden-haired," or "blue-eyed," or "white-skinned." The vase-paintings follow the popular idea, and, where the color of the hair is indicated, the mighty warriors of the Greeks are commonly shown with yellow locks. Curiously enough, Ulysses, the small but crafty king of Ithaca, is an exception, being represented with black hair; and M. Dieulafoy suggests that this exception discloses the ancient idea of the early inhabitants of Greece, among whom, after the intermixture of the foreign elements, fair hair and skin came to be associated with broad shoulders, tall stature and simple courage, while the Semitic dark complexion was associated with ingenuity and astuteness, rather than bodily strength.

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TWENTY-NINTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.



Detail of the Etablissement Crespin-Dufayel, Paris, France: M. Rives, Architect. From *La Construction Moderne.*

IF the architects of this country could only manage to construct their buildings with the same degree of skill and polish with which Mayor Walbridge built his words and phrases into one of the neatest little speeches of welcome we have ever listened to, he could not say, as he did, that just as we Americans have no language, having borrowed it from other peoples, so we have no architecture, having borrowed from other races the styles they had invented. The analogy he established between language and architecture was a very welcome variant upon the ordinary comparison at such times with "frozen music." The Mayor's felicitous remarks and the courtesy of Professor Ives, the Director of the Museum of Fine Arts, made the closing of the first day of the Twenty-ninth Annual Convention of the American Institute of Architects at St. Louis really memorable.

As for what preceded it, it is hard to escape asking the questions: "Is this sort of thing really worth while? What does it all amount to after all? Can a machine that needs so much oiling to prevent friction be properly designed? Can it ever do the work it was intended to accomplish?" While the coalition of the American Institute of Architects with the Western Association of Architects, six years ago, was beyond dispute a wise measure, it is also pretty certain that a grave mistake was made at that time in abolishing the distinction that had thitherto obtained in the Institute between Fellows and Associates.

As the Western Association had but one grade of membership, it was impossible that they could be expected to join the Institute as members of the Institute's lower grade, and it was equally unjust that they should all become members of the higher grade over the heads of the Institute members of Associate rank. The only solution was to put all members at the time of the coalition upon an equal footing, and the grade of Associate had to be abolished.

But the need was a temporary one. The coalition has been made; all members of the Institute are now of the same grade and yet they are far from happy, and the cause of their unhappiness, apparently, is that there is too much equality, seeing that the equality is one of name while the inequality of artistic and intellectual capacity is still conspicuous and as galling to natures of one kind as it is hampering to natures of another kind.

There is a very pronounced feeling that the Institute is not that body of *élites* that it should be, that all the members would like it to be and which can only do really good work when it has become such. Yet, all the same, it is a very excellent body, doing useful work and likely to do better as time goes on, for in a civilized and progressive world all things ameliorate, and the very friction that now requires such profuse application of oil is polishing off the offensive crudities that offend the higher sensibilities.

There is no need of resorting to the violent and reactionary measures that some members appear to be dimly hinting at. The cure, or, at least, a real and permanent palliative is within reach, and it is seemingly a simple one. The feeling that the Institute, as now constituted, is too democratic, or, at least, not sufficiently aristocratic, is a natural and healthy one, since it betokens aspiration after higher and better things. If, as is certainly the case, it is felt to be a wrong that the newly-elected youthful practitioner should hold the same rank, so far as the public is advised, with the leaders of the profession of double his years and quadruple his professional experience, things can be set right and information conveyed to the public through the very simple measure of restoring the two grades of membership, Fellowship and Associateship.

In such event, where all would like to be Fellows while most must remain Associates, how can the separation be effected? Very simply, and by the thoroughly democratic method of selection by ballot.

If it could be arranged that one-quarter or one-fifth of the present members who received the highest number of votes should be advanced to a higher grade, something would have been gained which would have a definite meaning to the public and a real value to the Institute and the profession at large. Having taken this step, the next would be to establish the regulation of the method of examination by which those members of the second grade could obtain entrance to the first rank, and with this would be secured the further great gain that whatever may really have been the qualifications and attainments of that portion of the first grade who obtained the rank through the suffrage of their fellows, those who were advanced later certainly did possess a definite and established professional capacity, and those men of real ability who now refrain from joining the Institute because of its, to their thinking, too democratic composition, could no longer plead their unwillingness to endure its levelling tendencies.

Some such change as this appears to be the way to meet and overcome the feeling of dissatisfaction that seems to be in the air, and a change like this can be adopted more easily and more safely than the more radical ones that some members would like to see enforced.

Although but little was actually said on the subject, yet all through the discussion, during the first morning session, of the matter of amending the by-laws, more than one debater tried to interject it, but the discussion was by the strict ruling of the chairman kept from wandering from the point, and the noon lunch gave time for that informal interchange of views that has so often saved the situation.

As to the amendments to the by-laws, these amounted practically to rescinding the action taken at the last convention, which seemed to restrict the freedom of action of the Chapters. Mr. Kendall, acting as spokesman of the Directors, explained that the action of the last convention had not been intended to restrict but actually to enlarge the powers of the Chapters, but that since the measure had been generally misunderstood it was evident that, if nothing else was the matter, the language of the obnoxious by-law was obscure and misleading. He therefore brought forward a series of amendments to Section X of the By-laws which, after prolonged debate and some opposition, were finally adopted.

The general purport of Section X in its amended form is this: Taking it for granted that it is desirable to increase membership in the Institute, and that there are certain architects who for one reason or another desire to obtain such membership while they do not care to acquire active membership in the nearest Chapter, the amended Section X allows such Chapters as may so desire to establish a second-grade of Chapter membership at half the usual dues of such Chapter, whatever they may be. The payment of such half dues assures to the member paying them no vote in control of the Chapter's actions; it is only an enabling step which will allow the member to then seek admittance to the Institute itself under the usual conditions and stipulations and upon payment of the full initiation fee and annual dues, as now. Entrance to the Institute can still only be obtained through the Chapters, except in cases of isolation as now, and except that the Directors, in their discretion, may elect to direct membership in the Institute any architect who for twenty years had honorably practised his profession.

In order to prevent this "half-grade" membership from being detrimental to the Chapter, it is provided that if such member at any time resigns from the Chapter he, *ipso facto*, resigns also from the Institute, and on the other hand resignation of such half-grade Chapter member from the Institute carries with it resignation from the Chapter. Moreover it is anticipated that as all are more closely and more naturally interested in the local matters these half-grade Chapter members will not be content to be mere onlookers, but will sooner or later wish to have a voice in their control and will so become full members of the Chapter as well as of the Institute, even if it does entail a slight additional expense.

To these and other slight verbal changes in Section X was added a clause of possible usefulness but containing so large a germ of contention that it is remarkable that it should have been adopted. This new clause empowers the Directors to issue a charter to a new Chapter for a territory which is either wholly or partially occupied by an existing Chapter and covered by its charter. Action of such

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nature can be taken by the Directors only after consulting the wishes of the Chapter first in the field and weighing the value of the arguments it may prefer against the invasion of its territory; but if the Directors consider the advantage to accrue to the Institute itself through the dual occupation of the territory sufficient to outweigh the objections of the elder Chapter, they can grant the second charter in spite of the opposition, and the invaded Chapter seemingly has no right of appeal to any one.

With the exception of this last-mentioned measure the amendments were all very desirable ones and are so carefully considered that no Chapter right is lessened or invaded, while they offer the chance of a great material benefit to the Institute itself. Probably the trouble that is dormant in the clause relating to dual charters may never declare itself, since the President stated that his two years' observation of the working of the Directors had shown him that in cases of uncertainty the Board inclined more toward inaction than to hasty action.

Aside from the reports of the standing committees and the opening address, the entire day was consumed by the discussion of the amendments to the By-laws.

In his opening address Mr. Burnham developed at least one important and interesting suggestion. He said he felt that it was full time that the Institute had its own proper and respectable quarters, not merely a room or suite of rooms, but a building of proper architectural character erected in some city — presumptively, New York — owned and controlled by itself and in which it could have not only its meeting-rooms and library, but also have a "memorial room" in which could be safely gathered and exhibited memorials and portraits of distinguished members of the profession and such of the original drawings of their important works as it is really desirable to preserve. Under present circumstances such drawings and records, on an architect's death, are left to the generally inappreciative care of his heirs and are destroyed, injured or mislaid and lost sight of sooner or later, and in this way valuable personal and professional data are made absolutely unproductive of good. This condition of things seemed to be not only wrong, but needless. These data should be secured by the Institute and placed in a memorial room in a fireproof building, and he felt not only that such a building should be built but that it could be built.

When he had committed himself by this rather ambitious suggestion, it might have been expected that he would explain how easy it would be to gather together a syndicate who, using the Institute as a nucleus and bait, should proceed to erect an office-building and lease office-room to dealers in building-supplies and to those who are always seeking for well-lighted studios; that by doing things in this purely business way the undertaking of providing a home for the Institute could be safely and economically undertaken. But not at all! Such a scheme as this was far from Mr. Burnham's thought. He at once made it plain that he had conceived the project from the highest conceivable point — that he believed that it would be possible for the Institute to have built for it by the wealthy friends of Art, a building which should be purely devoted to administering to the real need and requirements of architecture as represented by the Institute, a building that should be a worthy memorial of the architects who have gone before and a true record of the best that American architecture is capable of accomplishing at the close of the nineteenth century.

It is an interesting and audacious suggestion, but not by any means one which cannot be carried out, and the Convention appointed Messrs. Burnham of Chicago, Post of New York and Warren of Boston, a committee to carefully consider the suggestion and devise a consistent scheme of procedure.

Mr. Stead, of Washington, said he believed that it would be entirely possible for the Institute to procure at least the temporary use of a suitable room for the storage and display of its valuable collections in the new Congressional Library Building.

The futility, the uselessness of much of the cumbrous machinery that associations of all kinds find it necessary to maintain through a blind respect for traditional methods, although the existence of this useless machinery is the cause of the constant tinkering which annual conventions of all kinds waste their time over, was beautifully shown by the report of the Standing Committee on Foreign Correspondence. Mr. Jenney reported that he had found the greatest difficulty in finding out where the records of foreign correspondence were and who had them. Having at length hunted them down, he proceeded to acquaint himself with his new duties by a study of these recovered archives, but found that they consisted of copies of a single letter written in 1874 and a second letter in 1884, and that as the periodicity of these foreign communications was already exceeded, he would be very much obliged if any one would instruct him as to who should be the recipient of the overdue decennial letter. Yet, the Convention in place of abolishing this committee has gravely continued it in office. Is the honor of filling a wholly useless office really of any value to any one?

The Committee on Uniform Contract was, however, discharged.

The report on Proportionate Representation of Chapters was not forthcoming and this matter, therefore, received no consideration. Neither was it possible to take any action on the proposed change in the Constitution, because not enough members had forwarded their letter-ballot. The Convention authorized the Secretary to issue a new letter-ballot in the hope that a decision might, at length, be reached.

There was practically nothing in the way of business to come before the Convention on the second day, and the morning was in the main occupied by the reading of two very interesting papers of very similar character, and both inferentially expressing a feeling of yearning and dissatisfaction. Both contained abundant good suggestions and afforded ample food for consideration and discussion — too ample, in fact, for when those who had listened attentively began to express their views on what they had heard they spoke with unusual timidity, as if they were not sure that they understood just what the writer of the papers really recommended that the Institute should attempt to do.

As the text of these papers is not before us at the moment, we confess to the same doubt as to the precision of our recollection of the nature of the recommendations actually made, so it is not possible to discuss them here. The papers will be published in full, and more than this, their subject matter is positively assigned for full consideration next year, the matter being brought up by the report of a special committee, consisting of Messrs Clay, Patton and Sullivan, of Chicago.

The rather important attempt that was made to discuss the matter on the floor, not only revealed the uncertainty of mind we refer to, but also showed that, if continued, the discussion would inevitably wander over so wide a field that a great amount of time would be consumed in reaching decisions upon many of the points which had been made by the writers. The Convention, therefore, wisely concluded that the proper course would be to refer these papers to a committee. This committee, however, is not to consider the matter and make a report of the views which its unassisted wisdom enables it to prepare: it is instructed to seek advice and suggestion from every quarter and then to collate, compare and digest the suggestions they may in this way receive and submit a full report in print thirty days before the assembling of the next convention. As this committee is expected to have abundant work to do, it was thought best that its members should all reside in the same city, so that they might have easy and proper meetings for discussing their work.

As the next Convention is to be held at Nashville — at the urgent invitation of Mr. W. C. Smith, backed by the Mayor, the centennial exhibition authorities, the Governor of the State and sundry other officials of prominence — and as Nashville has but little to tempt architects to travel long distances, it is not unlikely that this report, which may be important and may recommend radical and even violent organic changes, may be discussed and acted on by only a small number of the members of the Institute, and this, it seems to us, would be possibly very unfortunate.

This possibility emphasizes in a fresh way the desirability of a permanent home for the Institute, to which all would soon form the habit of resorting, as a matter of course and annual recurrence. The chance wisdom of the past peripatetic assemblages might be expected then to give way to the consistent and sustained policy of those men who have the welfare of the profession sufficiently at heart to take part in the guidance of thought and action at other times than those irregularly occurring seasons when a convention chances to be held in the city of their residence.

The evening was made truly memorable by Mr. Van Brunt's tender and feeling eulogy of Mr. Hunt, his life work and the influence he has had not only on the architecture of this country, but still more upon its architects. How great this influence was we imagine Mr. Hunt never suspected until the coalition convention of Cincinnati took place. At that time, it may be remembered, that a letter from Mr. Adler was read in which he stated fully, frankly and persuasively the strong belief he felt that Mr. Hunt was the one man best fitted for the presidency of the reorganized Institute. The unexpectedness and the delicacy of the tribute was too much for Mr. Hunt, and breaking down absolutely in his attempt to say a word or two — perhaps the only time in his life when words failed him — he could only bury his face in his hands and sob like an hysterical woman.

Mr. Van Brunt was followed by Mr. Post, Mr. Kendall and Mr. Ferry, but Mr. Van Brunt's words hardly required endorsement or strengthening.

Between the morning and the evening session the local Chapter, according to custom, conducted their visitors in coaches and carriages through the new residence portion of the city and the beautiful natural Forest Park. To Eastern men this excursion was a surprise and a revelation. Almost all had expected to find a flat and uninteresting prairie country, so far as its natural characteristics were concerned, with here and there some piece of interesting architecture; but none of the Eastern men were at all prepared for the varied character of the natural scenery nor for the very great amount of interesting and refined work that the younger architects of St. Louis have been doing in the last few years.

The drive was interrupted at several points: first, to examine the extremely interesting group of improved warehouses, known as the "Cupples group," which have been devised and carried out by Messrs. Eames & Young in such a way that not only have the wholesale grocery and hardware trades of St. Louis been revolutionized, but the city has been endowed with an architecturally monumental group of buildings. The second stop was at Washington University, where Professor Johnson had prepared some tests on full-sized wooden beams and posts. Very few, probably, carried away with them any remembrance of the figures which resulted from the test, but all have a vivid recollection of how the beam broke

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down and the post crimped up under the enormous strain, which was enough even to force the oil through the five-inch cast-steel wall of the cylinder. The final stop came at the Columbian Club-house, designed by Mr. A. F. Rosenheim, where all, having first washed off the soot — the only one disagreeable feature of the visit to St. Louis — sat down to one more of the "lunches" with which the visitors have been so bountifully provided.

The ballot for officers on the last day resulted in the election of George B. Post, of New York, *President;* Henry Van Brunt, of Kansas City, *First Vice-President;* Wm. C. Smith, of Nashville, *Second Vice-President;* Alfred Stone, of Providence, *Secretary;* S. A. Treat, of Chicago, *Treasurer;* and D. H. Burnham, of Chicago; J. W. McLaughlin, of Cincinnati; W. S. Eames, of St. Louis; C. F. McKim, of New York; F. M. Day, of Philadelphia; N. S. Patton, of Chicago; R. D. Andrews, of Boston, as *Directors* for three years. Mr. W. R. Briggs, of Bridgeport, was elected a Director *vice* Van Brunt promoted.

Mr. Berg's paper on discoloration of plaster elicited more practical discussion than any that was read, Mr. Post, in particular, drawing upon his large experience for the benefit of those present. He said that the new asphaltic material, described by Mr. Berg, might prove to be a very useful thing, but that he had been advised by Mr. Theodore Cooper that while asphaltic compounds could be safely used in dry places, they oxidized rapidly in the presence of moisture. For himself, he believed that so far as the protection of iron went — for which Mr. Berg had suggested the new compound might be used — he believed there was nothing better than simple boiled linseed oil mixed with a little lamp-black, or, better still, with a little chrome yellow, as this latter material would make it easier to discover imperfections in the protecting coating. Next to this, finely-ground graphite in boiled linseed oil mixed with a pure Japan varnish for a dryer, he had found most desirable. Unfortunately, the best coating of all, pure red-lead in oil, could not be used, because it set with such rapidity. In all cases, no matter what covering material was used, the first consideration was to thoroughly clean the iron and then to use plenty of muscle in brushing on the oil.

Mr. Bullard's paper on the Woods of Washington brought out a protest from Professor Johnson, who declared that the tests quoted were imperfect in character and the results misleading, worthless and mischievous. As the time for final adjournment had arrived, the Chair had to cut the discussion short and invited Professor Johnson to reduce his remarks, made and unmade, to writing, that the Institute might have the advantage of their publication in the *Proceedings.*

After adjournment the visitors were driven to another section of the city and to still another beautiful park, and the break in this trip occurred at the great Anheuser-Busch Brewery. Here, too, hospitality declared itself in the form of another lunch, which, naturally, was not served dry.

As the Eastern trains leave late in the evening the thoughtfulness of the hosts was shown by their preventing any of the usual uneasy loitering about in hotel corridors, by taking every one to the theatre. In simple truth, the St. Louis Chapter, by the perfection of their arrangements and the bounteousness of their hospitality has made it very difficult for any Chapter playing the host in the future to equal the record that has been made this year. After all, there is much of real value in the informal proceedings at these annual conventions and it is by no means wasted effort to make them thoroughly enjoyable and attractive.

The apothegm with which Mr. Post acknowledged his election as President was a fitting valedictory. He declared that there were two things that each architect should consider a duty: first, to become, or attempt to become, a member of the American Institute of Architects, and, second, having acquired membership, then to do the utmost in his power to elevate the standard of architectural and professional performance.

REPORT OF THE COMMITTEE ON EDUCATION, AMERICAN INSTITUTE OF ARCHITECTS.[1]

AT the last Convention a Report was presented in the name of the Committee on Education, in which the opinion was expressed that by united action on the part of the several schools of architecture in this country, something could be done to procure for our present phase of civilization, and for the more satisfactory state of things which may be expected to follow it, some such architectural expression as, in the past, the civilization of almost every period seems to have received. The suggestion was made that an improvement in the methods of studying Architectural History in the schools would conduce directly to this end.

The Convention treated this report with sufficient courtesy, but declined to discuss the suggestions therein contained, referring it back to the Committee for further consideration. It seemed that there was not sufficient information at hand as to what the schools were actually doing for the Convention to form an intelligent opinion as to any improvement of methods.

This Committee accordingly proceeded to distribute copies of their Report with a free hand in different parts of the country, hoping to obtain the intelligent coöperation, not only of the schools, if they were inclined to give it, but of any other persons interested in the subject of architectural education, in the discussion of its propositions. The result has been somewhat disappointing. It has been in receipt of a considerable number of communications from the schools, but these have, for the most part, given information only as to the subjects taught and the number of years, days and hours spent in teaching them. At the same time have arrived a number of letters from other quarters, some of which have taken up in a rational spirit the questions at issue. But, somewhat to the chagrin of the Committee, their report has, for the most part, been looked upon as the first gun in a campaign for a new and distinctive American style,— than which nothing was further from their thoughts,—and the echoes it has aroused have been equally far, for the most part, from furthering any useful purpose.

It appears that the time given to historical study, including the study of Historical Ornament, varies in the different schools from about two hours a week, for two years, to four and even eight hours a week, for three years. This is independent of the writing of papers on architectural subjects, which though it seems not to obtain at all in some schools, is a conspicuous feature in others. All have continuous courses, tracing the development of architecture from the Egyptian period to that of the Renaissance, some of them including the present century, and one, at least, touching upon Indian, Chinese and Saracenic styles.

If we take up the schools in what seems to be the order of their establishment, we find that at the Cornell University five hours a week are given through one year to Ancient and Mediæval History, and three hours a week, through the chief part of a year, to that of the Renaissance. It does not appear that any work of a specifically literary character is required, except, perhaps, in connection with the graduating thesis, the preparation of which occupies the chief part of the Senior year. The course virtually occupies three years, there being in the Freshman year no strictly architectural instruction.

At the Massachusetts Institute of Technology the first year is given to non-professional and preparatory studies and the History does not begin till the third year. There are then three lectures a week for two years, and, besides the writing which may accompany the graduating thesis in the fourth year, the class take turns in writing descriptions of the principal buildings which occur in their historical studies, accompanying these papers by illustrative drawings and tracings. It does not appear that there is any separate study of historical ornament.

The University of Illinois has a year of nine months, divided into three terms of four, three and two months, respectively. During the seven months taken up by the two long terms, there are, every week, two illustrative lectures and two recitations. These are followed in the short term by two months' work in drawing out, in a large scale, details illustrating the ground previously gone over. The lectures and recitations are continued during part of the Junior year and are followed by weekly reports and discussions upon investigations of assigned topics, mostly historical. These exercises occupy an hour and a half or two hours each. A similar work is done by the Seniors in preparation for their graduating theses. There is no architectural instruction in the first year.

At the University of Pennsylvania, the professional work begins in the Freshman year with exercises in Graphics and Elementary Design, which are followed in the Sophomore and Junior years by a course of historical lectures occupying two hours each. There are also exercises in English Composition, but it does not appear that they are specially concerned with historical or professional subjects.

At Columbia College, also, the first year is largely occupied by professional studies, among which Architectural History, including Historic Ornament, has a prominent place. Three hours a week are given to these subjects throughout the year, besides an hour of historical drawing. In the second and third years this assignment of time is continued, French and German text-books being used, and in place of the one hour of historical drawing, fifteen hours a week are given up for six or eight weeks in the second half of the year to historical drawing and research. An hour a week is also given throughout these two years to writing upon architectural subjects, a considerable portion of which have an historical character. In the fourth year each student prepares, once a month, a lecture on some historical subject, which he reads to the class and illustrates with his own drawings. During the summer vacation all the classes prepare written memoirs containing lists of the principal personages and events which distinguish the historical period they are about to study, and prepare drawings or tracings of historical maps.

In the recently established course at Harvard University lectures on the historical development of the styles continue during three years, and the classes make a certain number of drawings illustrative of the periods taken up. These lectures are supplemented in the Junior and Senior years by Professor Norton's courses on the History of Art, and by Professor White's on the Domestic Life of the Greek and Romans. This work is accompanied by literary exercises of a more or less historical or professional character.

Besides these more fully equipped schools of architecture, lectures in Architectural History are given at Princeton and at New Haven, at the Case School in Cleveland, at the Pratt Institute in Brooklyn, at the Armour Institute in Chicago, and perhaps in some other places. The architectural classes at the Metropolitan Museum in New York, which were singularly well situated for the study of the architectural styles, have unfortunately been discontinued.

The evidence thus collected seems to show that it is not necessary for the Institute of Architects, as was suggested in last year's report,

[1] Presented October 15, 1895, by Mr. Henry Van Brunt, F. A. I. A., of Kansas City, Mo.

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to ask these schools "to systematize and coördinate the study of the historical styles." They are already doing so. Some of them are giving such studies a chief part of their care, supplementing them by whatever auxiliary service the literary, historical or artistic resources of their environment will permit. What significance or expression the students of these institutions are taught to impute to these phenomena, it is not easy to gather from the reports that have reached us. But they can hardly fail "to learn how form and ornament were developed out of the genius of civilization and peoples, and how they should be used in the service of modern art."

Only time can show whether such studies will ultimately realize the hopes which the Committee venture to express, by leading to an "effective concentration of intelligent effort in developing a system of architectural forms that shall be nationally characteristic and shall be more accurately adjusted to the expression of modern American life" than those which at present find acceptance.

A more practical method of bringing about the results aimed at in the report of last year has occurred to the committee. It proposes to refer to the post-graduates those larger subjects which the limitations of the schools prevent them from properly considering. In fact, it seems that the Institute may itself do something to bring to bear upon such questions the intellectual and literary force to be found among its members, by proposing for discussion some definite topic relative to these issues, and concentrating opinion upon it by organizing the sort of conference which is nowadays called a "symposium." An intellectual banquet of this sort would be an appropriate feast to set before the next Convention, and this Committee, thinking that as a stimulous to education nothing could be more inspiring than such a discussion, venture to propose such a scheme for the coming year.

What they have in mind is to invite half a dozen gentlemen, members of the Institute, each to prepare a written paper upon some topic related to the higher interests of the profession, a subject of an artistic and historical character, throwing light upon the development of architecture in this country, past, present and future. Ample time should be given. If on coming together and comparing opinion, all should say the same thing, as sometimes happens in the dull monotony of extemporaneous debate, the effect of the monotony instead of being dull would be exciting to a degree. A singular interest would attach to such a consensus of opinion. If, on the contrary, as would probably be the case, a marked divergence of view were presented, the situation would be even more animated. A discussion could hardly fail to ensue which, being the encounter of well-equipped champions, would be well worth witnessing. If the subject of debate were made known to all the members of the Institute some weeks before the Convention assembled, everybody might come more or less armed for the fight.

This is the only proposition in the line of last year's suggestion which, upon consideration, the Committee now have to offer. They were asked to reconsider their report and have done so, with this result.

REPORT OF THE COMMITTEE ON PUBLICATION AND LIBRARY, AMERICAN INSTITUTE OF ARCHITECTS.[1]

Your Committee was appointed at the meeting of the Directors in January. It was overlooked that the Committee was a new one and no duties were assigned to it. It, however, assisted the Secretary in reviewing the verbatim reports of the last Convention.

At the meeting of the Directors in June, the following instructions were adopted:

The Committee on Publication and Library will assist the Secretary in the preparation of the Proceedings and other publications and in all matters pertaining thereto, shall, in the absence of definite instructions and in the interpretation of instructions, have full authority with power to act.

Your Committee would respectfully recommend to this Convention that it be authorized to condense the reports of the Convention by the selection of important speeches and the preparatión of a general *resumé* of the rest.

Papers called for in the official programme and read before the Convention to be published in full from the manuscripts of the authors.

Respectfully submitted, (Signed) W. L. B. Jenney, *Chairman.*

REPORT OF COMMITTEE ON FORKIGN CORRESPONDENCE, AMERICAN INSTITUTE OF ARCHITECTS.[1]

At the meeting of the Directors in June, a communication from Mr. R. M. Hunt was read, earnestly requesting that his resignation might be accepted, not only as Chairman of the Committee on Foreign Correspondence, but also from the Committee, as he was unable to perform any of the duties. With much regret the Directors accepted Mr. Hunt's resignation. The vacancy was not filled, and the next in order of appointment on said Committee was instructed to act as Chairman.

As far as your Committee can learn there has been no foreign correspondence since the World's Fair, calling for the action of your Committee, the question of the return of Bruno Schmitz's designs of the Grant Monument being in other hands, and the few publications and communications received from foreign societies having been sent to the Secretary direct.

We are informed that no papers have been found in Mr. Hunt's office pertaining to the work of the Committee on Foreign Correspondence. After considerable research the archives of the Department of Foreign Correspondence of the American Institute of Architects were discovered in New York City by Mr. Bloor, and forwarded to this Committee.

An examination shows that the last letter therein recorded was written May 18, 1885, ten years ago. The previous letter, or the one before the last, was written twenty years ago, so that the foreign correspondence of your Committee has been one letter each ten years. The time has now arrived for a new letter, but unfortunately, either from the recent hard times, or some other cause, your Committee has been unable to discover any person to whom it could consistently address it, and is forced to leave the labor of preparing and forwarding this decennial letter to the new Committee.

It is suggested that hereafter all foreign matter be referred at once to the Committee on Foreign Correspondence, and that it shall be the duty of said Committee to give to all such the most prompt and courteous attention. Respectfully submitted,

(Signed) W. L. B. Jenney, *Chairman.*

SUGGESTIONS BY WHICH A GREATER INFLUENCE MAY BE EXERCISED BY THE INSTITUTE AMONG THE ARCHITECTS OF THE SOUTHWEST, AT THE SAME TIME, THE ELEVATION OF THE PROFESSION BEFORE THE PUBLIC.[2]

The historiographer tells us that the initiative for the formation of this, the American Institute of Architects, began in New York City in the year 1836, fifty-nine years ago, and was made by a few thoroughly educated architects, for the purpose of uniting in fellowship all the architects of this continent, and for the further purpose of combining their efforts for the promotion of the artistic, scientific and practical efficiency of the profession. At that period the population of this continent was about 17,000,000, throughout twenty-six States, and the probability is that at that time there were not one hundred professional architects in this great country.

This initiative movement was only a beginning, one, however, that had a latent force, which from that date, with varied successes, has developed itself into the present Institute. The seed as then sown is now yielding its fruit, as evidenced by this meeting of the Institute, a meeting of the representative architects of America, assembled from forty-four States representing 62,000,000 of people.

There are 5,000 architects in these States, of whom nearly 500 belong to the Institute. These are bare statistics from the beginning of the Institute in 1836 up to this date, 1895.

We are told that the motive of the fathers of the Institute was primarily altruistic, and secondly to promote the greater efficiency of the profession, but I am of opinion that there was another, a hidden and greater motive, obstacles to be overcome for the well-being of the profession, obstacles that architects, acting individually, could not set aside, but by uniting as a body, they hoped to gain sufficient potential influence to overcome and thereby to establish themselves before the people as professional men. These obstacles and impediments that confronted our brethren sixty years ago are confronting us to-day with greater force and in more varied form.

My object in this address is to point out these impediments and to suggest ways for their removal, for the better influence of the Institute, and the general standing of the profession of architecture in the United States.

We have as object-lessons the three great professions, viz, the Church, Law and Medicine; their standing and efficiency as cohesive bodies has been brought about by great unity of purpose, well disciplined by self-government and proper education. True, the Church is divided into numerous denominations, yet each one is a power unto itself; it has its own system of government, rigid and firm, its own seminaries, schools and colleges, for the education of its priests and laymen. The Church requires the profound education of its servants and a strict obedience to its ethics; a disobedience of the one or the other causes trials, with suspension or expulsion, as found proper. By a strict adhesion to all requirements, and because of the intelligence and learning of its clergy, the Church as a whole commands the respect and admiration of all people. It is a body jealous in its calling and exacting as to its internal regulations — and has a membership of 111,000.

The legal profession is one also of great learning and having a *quasi* recognition by the general government and all the States of the Union, and being a part of the body politic of the people, does not require this discipline like the Church. Yet it has its own governmental laws and ethics, and a disobedience to the one or the other means a disbarment. This profession has seats of learning, examinations in legal qualifications and all co-ordinate branches of law. State licenses must be obtained before practising is permitted in any court. Like the Church, this profession, too, is a jealous one. It has a membership of 175,000. The medical profession, as the Church, is dependent on its own self-government and procedure, and like the Church, too, is divided into different schools of medicine.

[1] Submitted at the Twenty-ninth Annual Convention, A. I. A., October 15–17, 1895.

[2] A paper by Mr. James B. Cook, F. A. I. A., of Memphis, Tenn., read at the Twenty-ninth Annual Convention of the American Institute of Architects held at St. Louis, Mo., October 15–17, 1895.

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Each one has nearly the same governmental laws and rules of ethics, each controls its own schools and colleges, chartered by the States in which they are educated; each issues diplomas of proficiency which carry with them permission to practise medicine with certain rules and restrictions. The medical profession is also a jealous profession, and has a membership of 105,000. The Church and the medical profession, under their several charters, have the right of conferring degrees on their respective students, according to their collegiate or scholastic proficiency.

With the above as a preamble, I will now speak of ourselves, the architects of the United States; but before entering upon the same, I would call your attention in a few words to the standing of architects in England, France and Germany, in order to give greater weight to my future remarks.

In England architects are recognized as distinctly professional men, and are patronized as such, and attainments of high artistic and scientific order are required of them. No young man attempts to enter the profession unless backed by independent means for his support during the probation requisite to qualification for the profession. The curriculum necessary for the proper qualification is costly: generally a five years' collegiate course, or to be articled to some prominent architect by the payment of a large honorarium for a five years' learning in his office, after which he generally works a few years on a salary before he begins his individual career in the profession. Once launched upon his own resources, he must wait for clients, for "hustling" is unknown, and to obtain eminence the practitioner never quits study, for by his ability alone can he reach fame and official recognition.

The Institute of British Architects has a Royal Charter, and hence became the Royal Institute of British Architects. To become a member of this body, the applicant, beyond certain general qualifications, must pass a prescribed examination. The initials "F. R. I. B. A." mean an honor, and a distinctive something truly to be proud of.

In France the government controls the profession directly and indirectly, the studies and examinations are prescribed and licenses required, the result being that none save thoroughly proficient men can practise there. Their talent is recognized by the Government and by the people, and by them rewarded.

In Germany it is very similar, and in all these countries high attainments are necessary for success. "Heelers and hustlers" are unknown factors.

This, then, leaves us to ourselves. At the beginning of my address I stated that there must have been an unwritten motive in addition to the one expressed by the first projectors of this Institute in 1836. This motive in my opinion was that the founding of this Institute would be the means of establishing its members before the people as professional architects, and divorcing them from the builders; for at that period the architect, *per se*, was not understood, as the builder assumed to be both architect and builder combined. It was then to get the architect in his place before the people, and the builder in his, so that the architects in this country should enjoy as good professional standing as their brethren in Europe received.

The question then before us is, Has this divorce at this date been obtained? The answer is, that the work has not been fully accomplished. The increase in territory and population of the United States in the last half century has made it impossible; for under our present administration, we have not kept pace with this increase, as have the Church, Law and Medicine. We, as architects, exercise our profession exactly in the same States and Territories as do the clergy, the lawyer and the doctor. We work exactly in the same places, in fact, we are their pioneers. Why, then, if these three professions prosper under their well-organized administrations and rigid rules of ethics, could we not as architects do the same? Why should not our curriculum of learning be as great, our procedure as compact? Why should we not act under State laws as they do? If we did this, we, too, would get a proper standing and recognition as professional men. This country being a Republic, a government of the people, for the people, we, like other organizations, must do our own struggling for existence, and the survival of the fittest applies to us as well as to others. We need life and action, for we have no Royal Commission to sustain us; we, like the Church, the Law and the Medical Profession must protect ourselves and keep pace, as they do, with the developments of the nation.

The Institute is acting almost on the same lines it did twenty-five years ago, and the only tangible thing that has been done has been the enactment of a 5-per cent minimum fee and a uniform standard contract.

The Institute, we must admit, is known only in a few of our larger cities; outside of the same, so far as the public is concerned, it is unknown, in consequence of which architecture has little or no standing and is only recognized as an ordinary business. With whom lies this fault? Certainly not with the public, for the reason that we, as architects, have not yet taught the people what constitutes a standard for the profession. The fault is at our door, and our *laissez faire* policy has flooded the profession with pretenders in every city in the Union, fleecing their clients by their pretentions. These chartalans of the profession have been brought into existence by the Buddensiek class of builders, and are fostered and sustained by them to do their dirty work. Their creed is gain, and all the builder asks of these pretenders is to make a few lines and they, the builders, will work the rest.

The Institute, as now organized, is incapable of coping with all the evils besetting the profession, in every State in the Union, occasioned by these pretenders.

The lack of more extended power on the part of the Institute is causing murmurings of dissatisfaction amongst the legitimate architects of the outlying States, and secession has begun amongst those who find it necessary to resort to State institutions for their protection.

The great remedy lies with the Institute alone and should by the Institute be applied. This can be done by following in the footsteps of Church, Law and Medicine. Let us protect ourselves as they protect themselves. Let us be an organic body in every State in the Union, well organized and under one head, "The American Institute of Architects."

We must bear in mind that the Institute has no chartered rights outside of New York. Therefore, to give its members a legal status in other States, charters should be obtained in each State as a foundation of our existence. By such a procedure it gives to us the master-key of success, and the bed-rock upon which to build our organization. State organizations working together with other States along systematic lines will give us a power and prestige not to be overcome, and thus the profession can move as one man against its enemies, the Judases of the profession. And only by such State chartered rights can we move on the State and National Government to bring about the enactment of just and righteous laws, as will prevent the ignorant, incompetent and unprincipled men from obtaining recognition in the profession and before the public, and thus put an end to the shocking and oft-repeated holocausts in the tenement-buildings of our cities, and not unfrequently in assembly buildings as well, to say nothing of the endless procession of disease and death that follows in the wake of imperfect and unsanitary architectural construction.

Statistics give the number of clergy at 111,000; the number of lawyers at 175,000, and the number of medical practitioners at 105,000; the number of civil engineers at 43,000, and the number of practicing architects at 5,000. A curious minority on the part of the architectural profession. The question is reasonably asked, Why so great a minority? The answer is easily found in the fact that there are, outside of the 5,000 architects, 500,000 men directly assuming and doing building, exterior and interior, and indirectly in conflict with the profession. And this state of things has been brought into existence by the ignorance of the pretenders, who require such aid and assistance in their undertaking to complete the work, for without such aid they could not accomplish anything. Again, analyzing our own force of 5,000 practitioners, what have we? — 500 architects of the Institute, 500 worthy architects not affiliated with the Institute, 1,000 architects capable, but doing a sharp practice; the balance, 3,000, mostly illiterate, are the pretenders of the profession, the vampires that are sucking its life blood out and bringing disgrace to us all.

To bring about a reformation, we should

First. — Establish in every State, a State Association of the American Institute with State charters.

Second. — Establish Chapters throughout the State, to be under the authority of the State Association.

Third. — The President of each State Association in convention to form a Council and to meet at the same time and place as the Convention, and all matters relative to the Government of the Institute to be acted upon by the Council in conjunction with the general convention.

By the establishment of these State Associations of the American Institute of Architects it gives to the architects of their respective States a certain responsibility for the promotion of the profession, and the burden of success is upon them.

The Institute, too, should frame uniform laws for the government of these State Associations, should also frame uniform State papers for the application of charters for each Association and, above all, necessary procedure papers for the granting of State qualification licenses. Said licenses to be granted only by a proper and rigid examination, to be conducted by a qualified Board of Examiners. The charters should contain the necessary powers to establish technological schools and colleges, with such rights and powers as are granted to law schools and medical colleges.

The American Institute of Architects should be empowered to formulate a standard building-law, to be placed in the hands of each State Association, for the respective Legislatures to pass upon and to make State laws.

By the creation of a Council composed of the Presidents of each State Association, a just and proper representation is given to each State, and all grievances can be adjusted.

A candidate for admission to the Institute should first be thirty years of age, belong to a State Chapter, next he should be required to be a member of the State Association for at least one year. All applications for Fellowship should come through the State Association, and that by ballot of each member of the State Association. These applications to be acted on only at each annual convention and that by the Council. It should be the duty of this Council to frame all governing laws and to map out the general work of the State Associations. All the Council work should be laid before the general convention for final action and approval.

It is impossible in a paper like this, limited as to time, to place the subject before you in *extenso*. What I have said is merely in the way of suggestions, nevertheless, it deserves your serious consideration.

Before concluding, I would try to impress upon you the greater

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necessity of a thorough technological education for all young aspirants to the architectural profession. The requirements are greater at this period than ever before, hence the knowledge should be greater.

Hear what Justice Brewer said at the meeting of the Bar Association at Detroit, Michigan, August 29, 1895: "If our profession is to maintain its prominence, if it is going to continue the great profession, that which leads and directs the movement of society, a longer course of preparatory study must be required. . . . Why is a higher education to-day the special need of the profession? Because the law is a more intricate and difficult science than heretofore. Because, second, to preserve the confidence of the community in the profession each member must be qualified for the higher demand now made upon it, because his mistakes are freighted with greater possibilities of injury."

This address of Justice Brewer to the Bar Association at Detroit, with a change of a word or two, is our own need and can readily be applied to the architectural profession. We require a higher education for incoming architects and a positive prohibition from each State, so that none but well-qualified architects shall practise.

We need a thorough system of building inspection by reliable and competent inspectors to be appointed by the State.

What greater appeal can I make to you on this whole subject, than the number of structural accidents that have occurred this last year to buildings in course of erection? The most terrible on the list was the Ireland Building in New York City. The voices of its sixteen victims and the wails of their widows and orphans all cry aloud for a reformation in the laws that govern the erection of buildings, so as to prevent corruption and criminal carelessness, and ignorance and neglect in building construction.

With us lies this reformation; to us and with us lies the enforcement of the same by having proper safeguards.

We need a strong Code of Ethics. The Institute, comparatively speaking, has none. It should be a universal Code, to be carried out and enforced by the State Associations, stringent at all points, so as to relieve the Association from the pretenders and the unworthy, thereby placing the professional architects of America on a more elevated plane.

With all these safeguards, properly enforced, the architectural profession will then occupy a position with the Church, Law and Medicine, as it is destined to do, and will be regarded as it should be amongst all men as an ancient and honorable profession.

ART IN THE MODERN CHURCH.[1] — IV.

THE CHRISTIAN CHURCH.

THE designs brought together in the preceding chapter have been selected almost at random from a multitude of examples, which illustrate, in a more or less marked degree, the avoidance of the fundamental element of Christian architecture in our average church buildings. Not only do they do this, but they show in an alarming manner an ignorance of what should be considered before the work is undertaken at the outset. The element of Christianity in architecture is no new thing. On the contrary, it is as old as Christianity itself, and from the very earliest times, the Christians built church edifices that we invariably and unhesitatingly recognize as churches and nothing else. Indeed, this feeling goes much further back. The pagan temple, so far as our knowledge of the history of architecture extends, was invariably an unmistakable structure that could, under no circumstances whatever, be confounded with any other sort of structure. The temples of Greece and Rome, of Egypt and Assyria, if you please to go back to the beginning, or of India and China, if a ruder stage of culture is desired, all stood apart from every other contemporary structure. Their art was a different art from that used for other buildings. The decoration, the form, the combination of parts, all were distinct and separate.

In our own time, the church has been individualized to a certain extent, though the examples we have seen show how readily it may be confounded with other structures. That pagans have done better than this, that less advanced civilizations have produced more distinct models than we have done, shows how far our modern architects have failed to appreciate the real nature of the problem they have blindly undertaken to solve. It is not because they are incapable of properly comprehending the problem, but simply because they do not know of its existence. Bound down to the use of certain traditionary forms, they imagine that when these are combined in what they conceive to be the traditionary manner they are accomplishing all that should be asked of them. Yet when they do so, they fail, often enough, as we have seen, to produce a structure that has any ecclesiastical form, much less any real Christian spirit or feeling for godliness. And when they go off from the traditionary path, failure greets them on the way, as we have also seen, since a church cannot be made a church by strangeness of aspect or originality of invention.

It has been said that in previous times, the religious building was always differentiated from the secular — that no one ever mistook one for the other, nor was the art of one the same as the art of the other. If proof is needed, a hasty glance through the most elementary history of architecture will be sufficient. We may, for a moment, glance at some of the uses of forms in those times when architectural proprieties appear to have been more carefully considered than in our own. Let us take, as a type, the Palais de Justice, in Rouen. This is a late Gothic building, erected after the greatest cathedrals had been built, but it is a superb example of secular Gothic.

This secularity, in fact, is as distinctively its keynote as is the religious quality the dominant note in its neighboring cathedral. We have here the windows, the doors, the arches, the gables, the dormers, even the detail that we will find appropriately and religiously used in a church. Yet never for a moment do we confuse this design with that of a sacred building. The hint of such a thing is not so much as indicated. Instead, we have a broadly secular structure that fully answered the needs for which it was erected, and which we cannot help admiring, even though we think its delicate lacelike forms too refined and sensitive for cold hard stone. It is a very notable instance of building with materials essentially ecclesiastical and yet obtaining a highly satisfactory secular result. It shows how widely the two things may be separated, if the architect will recognize the difference and put his mind down to his work. It shows, finally, and this perhaps is as important a lesson as we may draw from it, that the employment of a certain set of forms does not necessarily result in an ecclesiastical aspect. It is not the forms themselves that make a building religious or secular, but their quality and the spirit breathed into them by their designer.

Obviously, if architecture is a mere trade, if the end of the architect's life is the gathering-in of "jobs" and the collection of rich and profitable clients, if it is a mercantile calling, pursued under the guise of an abortive art, we can have no truly Christian buildings, nor indeed aught but secular and commercial ones. If this be the prevailing note of our modern architecture, we must needs rid ourselves of our un-Christian architects and create a demand for a class who shall give heed to this important phase of art. Too long have we been accustomed to any sort of architecture in our churches, too long have we ignored the essentially religious and holy nature of these structures. Our sensibilities have been dulled, our notions of propriety perverted, our very reason affected, in the senseless ungodly manner in which we build God's house. A new spirit must be fused into this architecture, a new appreciation cultivated, a new feeling of reverence instilled into our architects when they stand before their drawing-boards waiting for an inspiratory idea to come to them unassisted, when, if they appreciated the magnitude and sacredness of their task, they would begin by prayer and fasting!

In the churches illustrated in the previous chapter are examples from the buildings of various branches of the Christian faith. The particular destination of the church is independent of the quality of its art. The Roman Catholic, indeed, will tell you that he alone has the true church, and there can be no churchly building other than that he himself possesses. The High Churchman may hint at a similar state of affairs for himself, nor will they be alone in their claims. But the architect is not called upon to discuss such matters. It is well to point out, however, that to the Congregationalist, the Methodist, the Presbyterian, to every Christian of every faith, the church building is as truly the house of God, is as sacred and as holy and as much set apart by its use from other buildings, as in those branches of the Christian faith which claim to be exclusively Apostolic and Catholic. We commit a great wrong when we excuse an unimportant design for a chapel or a church because, for example, it is Methodist, or do not require the same degree of Christian feeling in a Presbyterian church that we do in a Catholic cathedral. From the standpoint of the users of these buildings, they are alike dedicated to the holiest uses, and are symbols of the most sacred privileges of mankind. All should illustrate this in their architecture, so that every church building shall proclaim the glory of God and the power of His might. To the architect, every Christian building should be Christian; all should be designed in the same consecrated spirit, all should testify to their author's belief in the importance of his task and its sacred character.

But, then, we may be told, This may be good enough for those religious bodies that affect the use of art, that support an artistic ceremonial, that lay claim to exclusive privileges; we who have neglected these things, who have been content with plain little lecture-halls, or small unpretentious chapels, need not burden ourselves with refined interpretations of art, with symbolism, with hidden meanings, with elaborate structures, perhaps beyond our means. Our faith has waxed and grown strong in buildings that gave no hint of what you speak of; why, then, should we concern ourselves with it?

For the very reason that your lecture-halls, your churches, large and small, your buildings, old and new, if used for the worship of God, are the houses of the Most High. They are not ordinary buildings, wherein you may do what you please save at set hours on Sunday and on Wednesday or Friday evenings. Properly speaking, they are not concert-halls, to be rented out for secular purposes, nor for amusements, nor for theatrical entertainments, though we constantly hear of churches being put to these profane uses. (Profane, that is, when the house of God is desecrated for other purposes than His worship, though, in itself, the entertainment be as harmless as possible.) It is true that buildings put to such uses can scarce be differentiated from ordinary buildings; they have no exclusively

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1034, page 29.

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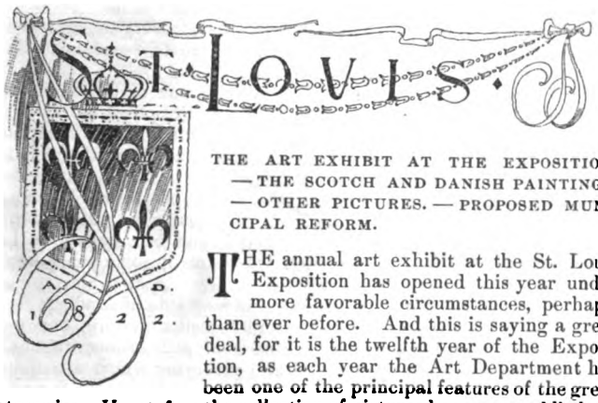
sacred purpose, they do not stand for one thing alone in the community, they are mixed edifices employed for miscellaneous objects; they are churches in name, or by courtesy, because the church services predominate in them.

And, verily, if churches are to be used miscellaneously, there is an end to them as distinctively Christian buildings. And if, in any community, there be not enough enlightened and pious souls to afford the setting apart of one structure for God's use and not for man's, then there is no need to argue for a Christian character in our religious edifices. A building can no more be half-Christian than a man can be half-Christian and half-pagan. It is true, many men put on a cloak of Christianity with their Sunday clothes as they dress for church, and quickly drop it early Monday morning; but an architectural construction cannot thus put on or off a character with the days of the week or the uses to which, temporarily, it may be put. It can only be Christian or un-Christian, and that is the end of the whole matter.

The architect, fortunately for himself, has no need, among his many cares, to determine the question of the secularization of the church building. The responsibility for any action on this must rest with those who are responsible for the church. But the architect is called upon to remember that a church will always be a church, no matter what may be the peculiar beliefs of those who worship in it, nor how varied may be the uses to which it may be put. He cannot ignore this phase of the question, though he has forgotten it, or never heard of it.

BARR FERREE.

[To be continued.]



THE ART EXHIBIT AT THE EXPOSITION. — THE SCOTCH AND DANISH PAINTINGS. — OTHER PICTURES. — PROPOSED MUNICIPAL REFORM.

THE annual art exhibit at the St. Louis Exposition has opened this year under more favorable circumstances, perhaps, than ever before. And this is saying a great deal, for it is the twelfth year of the Exposition, as each year the Art Department has been one of the principal features of the great enterprise. Heretofore the collection of pictures has possessed little or no individuality. They seemed to have been obtained from anywhere and nowhere, but this year more money has been spent towards obtaining at least one special collection. Mr. Kurtz, the director of the art exhibit, has done well this year, at least.

The leading features of the present exhibition are the Danish and Scotch pictures. The latter were contributed by the Glasgow School, and the entire collection, with the exception of a few pictures by Messrs. Gould, Hornel and Crowhall, shown at the Pennsylvania Academy of Fine Arts, in Philadelphia, last winter, here makes its first appearance in America. The majority of the other pictures are exhibited by American artists studying abroad or resident in this country, and in consequence are the mainstays of the exhibition, notwithstanding the attractiveness of the collections above referred to.

The Glasgow collection includes about one hundred and fifteen paintings, many of them of exceeding merit. They comprise the works of E. A. Hornel, William Kennedy, James Guthrie, T. Millie Dow, Joseph Crawhall and numerous others. The school is of recent origin, having been formally presented to the art world at an exhibition at the Grosvenor Gallery, in London, in 1889. The attention of the directors of the Munich Exhibition was then attracted to it, and the next year the Glasgow artists were asked to exhibit in Munich, and their work was so much admired that they have been represented there ever since.

Hornel exhibits nine pictures. The rich coloring of his works is beautifully blended. His earlier paintings somewhat suggest gorgeous tapestries, but his later works are more like splendid compositions in stained glass. His "May Day" is a revel in color, and there is evidence of enthusiasm and love of subject in every stroke of the brush. The Japanese pictures show the artist's earlier feeling intensified, the fruition of the promise of his earlier works. His "Street Scene, Tokio," with its gaily costumed people and richly colored banners swinging from the poles, is one of his best works, and, when compared with his other pictures, stamps him as a most versatile artist. "The Balcony, Yokohama," is treated in a more sober manner, although the subjects are in a way quite similar. The painting of the flesh and glossy black hair are admirable, and the coloring given to the water of the bay beyond and to the clouds is very true to nature, as we can testify.

It is somewhat of a relief to look at Guthrie's pictures after the gorgeous coloring just faintly described. They are full of exquisite feeling and subtile gradations of color. His portrait of Miss Wilson is a fine expression of character, while one of his pastels, entitled "Tennis," very much resembles some of Whistler's work.

Roche's "Spring" presents a rare combination of strength and delicacy. It is not a picture which can be seen for a moment and then dismissed, as its truthfulness so impresses one. Walton's picture, entitled "Alice," represents a child half lost among the leaves. The sunshine-and-shadow effect, depicted as penetrating through the leaves, is excellent. This is one of the artist's most characteristic and beautiful works. He is another of the school possessed of a certain versatility and equally successful in water-color, pastel or oil.

MacGregor's South African pictures and Spanish scenes are wonderfully vigorous. His exquisite water-color, entitled "On the Stour," is one of the best works in the collection. This artist was one of the most influential in the formation of the new school, and he is certainly one of its strongest painters. Paterson's landscapes, though possessing a certain individuality, seem very closely related in character to the work of George Inness. His "Castlefairn" is full of the spirit of nature. In Hamilton's "Venice," "Scottish Fishing Haven" and "Cliffs of Berwickshire," we have three pictures possessing great feeling, truth and beauty, while the coloring is different from that of the other artists. Gould's landscapes are to be noted chiefly for the excellent contrasts in sunshine and shadow among the foliage.

One of the more prominent artists of the Glasgow School, as far as it is represented at the exhibition, is Joseph Crawhall, Jr., who is a bird and animal painter. He possesses a certain directness and sweetness of touch which very forcibly suggest the art of the Japanese, though it has not in any way the effect of imitation. There is the utmost subtilety in his lines, as well as in his color. This is true of all his works. "The Aviary" we consider his most successful picture at the exhibition. It possesses rich, but beautiful, coloring, and betrays the keen artistic observation of bird life. Better subjects for his school and style of coloring could hardly be found than the vari-colored parrots which predominate in this picture. In "The Rabbit" the way in which he depicts the fur of the animal and the dreaminess or, rather, stupidity betrayed in the eyes is next to wonderful. The artist has not by any means confined himself to this class of pictures. His "Sunlight" and "The Florist's Window" are entirely different subjects. His animal and bird pictures are, however, the more successful.

The work of Mr. Pirie is particularly interesting to us, as the artist selected some of his subjects in the western part of our own country. His "Cowboy's Night Horse" and "Texan Broncho" give one a rather good idea of the regulation western broncho-pony. We do not admire the subjects, although we confess that their crudity possesses a certain amount of charm. His most important picture is "The Chase," which represents a game-cock pursuing a mouse, and one finds in the cock that same intensity possessed by its living representative.

Mr. Melville's aquarelles in the water-color gallery are six in number and are of the strongest character. This artist, though resident in London, is closely identified with the Glasgow School. His subjects are all Oriental in character. His "Arab Procession" is a beautiful production, possessing a certain delicacy, yet richness of coloring, only possible in a water-color. His "Sirocco," the scene of which is laid at Venice, represents an approaching "sirocco," or wind-storm, the gondolas and other craft tightly moored in anticipation of its effect, although the sun is shining brightly. The people in the foreground are touched in in the direct, incisive way that most strongly suggests the influence of Japanese art. "San Giorgio, Venice," is to be noted for its extremely delicate coloring and excellent though subdued contrasts.

The canvases shown by Mr. Millie Dow are of an entirely different style from those of the foregoing artist. His "Enchanted Wood," delicate and sympathetic in color, shows a nymph in the shadowy foreground, hardly apparent unless one looks at the picture very closely. The artist's various pictures of roses are excellent productions in still life, and his "Autumn Moonrise" possesses the same soft, dreamy suggestiveness as the "Enchanted Wood." The "Head of a Girl," by William Kennedy, is particularly rich and fine in color. "The Deserter," by the same artist, has in it more of the story-telling quality than most of the Glasgow pictures, but it is artistic in addition to the fact that the story is well told.

Whistler's pastels possess a degree of subtilty and an amount of reserve which are the distinguishing features of a great artist. His "The Shell," is a successful picture, while the work entitled "Mother and Child" is particularly attractive on account of the gracefulness of line and refinement in its color scheme. "The Storm," a large painting by the late George Inness, is the last work painted by this eminent artist, whose work harmonizes well with that of the Glasgow School. This can be clearly seen in "The Storm." The effect of atmosphere in this picture, the movement in the clouds, the strength of the coloring are especially fine, and the restlessness of the animal in the foreground feeling the approach of the storm, is depicted most realistically. "In the Woods," by the same artist, has a wonderfully tender sky. "From St. Ives to Lelant," is by another American artist, George H. Bogert, and represents a bit of coast along the foreground, a long stretch of water almost losing itself in the hazy distance, and a most luminous sky with a crescent moon. This work compares very favorable with the Glasgow pictures.

The other foreign school introduced to St. Louis for the first time is the Danish. This was brought about by the great success achieved

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by the work of the Danish artists at the World's Fair, in Chicago. Their pictures at the time impressed one as having been painted direct from nature, and as being almost literal transcriptions. The art directors of the local exposition had an opportunity to secure a small but satisfactory collection of Danish works and embraced it. The collection includes the work of some twenty artists.

The strongest of the Danish artists represented in St. Louis is Kröyer, who was a pupil of Bonnat, yet the French artist's influence is not apparent in his work. "Summer" is Kröyer's masterpiece, and shows a Danish garden in midsummer, with every shrub and plant in the glory of full bloom. A maiden lolls lazily in a hammock chair and tries to read, but the influence of the sweet-smelling flowers has proved too much for her, and she has sunk into a reverie. The large rosebush in the foreground filled with white roses is most realistic.

Edward Petersen's "The Rising Moon, Twilight," represents very faithfully the twilights for which the artist's native land is renowned, and depicts a stretch of landscape with a road leading from the foreground, along which an old man walks homeward after his day's work. The eastern sky, in which the moon is rising from behind a distant hill, reflects the georgeous coloring of the sunset. "Children at Study," representing children sitting about a table, busily studying their lessons, is the work of Viggs Johansen.

Sofie Holten Fonsok's picture, entitled "Marriage," is one of the most successful, not only in the Danish collection but in the entire art exhibit. It represents a wedding-party walking back through a pastureland from the church, where the wedding ceremony has been held, to the fraternal roof. There are some fourteen figures in the picture, all in native costume. Of course, the bride and groom lead the way, the groom in his knickerbocker velvet suit with double-breasted coat, and the bride with peasant costume and head surmounted by a tall hat. The bridesmaids follow with large white starched-linen bonnets, broad white aprons, and velvet waists with straps over the shoulders. The whole work is a most pleasing representation of Scandinavian peasant life.

Oscar Mathiesen shows two works, one entitled "Winter Landscape in the North of France," representing a roadway leading through a forest near the Château of Pierrefonds, and the other depicting a stretch of the west coast of Denmark, a waste of wind-swept sands with patches of coarse grass here and there, under a blue sky in which are swift moving clouds.

"Night and Dreams," a dark figure hovering over the earth, with fanciful forms, and filling the sky beyond, is by Prof. Lorenz Frölich, famous for his paintings in the Fredericksborg Palace, near Copenhagen, illustrating the history of Denmark. He is also an eminent illustrator, having been at one time the leader in this department of art in Denmark. He shows three of his drawings, entitled "A Family of Centaurs," "Christ and the Guilty Woman" and "Coming to the Rescue," which are chiefly to be noted for their vigorous treatment. "Oak Trees on the Beach," by Agnes Slott-Moller, is an odd work. Only the tops of the trees are to be seen, stretching across the expanse of sea, with a line of gray shore in the distance. The large canvas, by Henrik Jespersen, called "A Norwegian Landscape near the Fostedalsbro, Olden Nordfjord," shows rugged mountains half enveloped in clouds, a great glacier, and a foreground filled with huge masses of moss-covered rock.

There are other foreign works of merit by French, Dutch and German artists. "La Peinture," by Dagnan-Bouveret, has the half-nude figure of a young woman holding a palette in one hand and a brush in the other. A decorative scheme prevails in the coloring, and while not realistic in character, the flesh painting is superb in color and quality. "The Interior of a Tobacco Factory at Seville," by Walter Gay, is one of this year's *Salon* pictures. It is a study of lights and shadows in a large interior with numerous windows. The Spanish women, with their black, glossy hair, are typical and well depicted by Mr. Gay. Over seven thousand women are employed in the shop, a portion of which the picture represents and it was here that the famous cantatrice, Calvé, worked for six months in order the better to perform her part in the opera of Carmen.

A beautiful work, entitled "On the Loing, Morning," is by William L. Picknell, and shows a road leading from the foreground along a stream in which two barges are moored, while across the water, which reflects the blue sky, are seen the houses of a village. This is a picture in which it seems possible for one to walk and it impresses one as something seen out of a window, rather than a flat canvas in a frame.

"On the Dyke" is a quaint picture, by Elizabeth Nourse, with some peasant women and children standing on a dyke, the former looking out and trying to descry through the mist the incoming fishing-boats of their husbands. The day is stormy, the clouds are flitting rapidly by, the sea is rough, and while the peasant women wear an anxious look, the children, in their innocence, have a most contented expression in their faces.

Another fishing picture, but a larger canvas than the foregoing, is "Departure of the Fishermen," by Louis P. Dessar. The scene is laid on the shore near Etaples, France, in early morning, and shows the fishermen with their tarpaulins taking leave of their wives. The early morning light, the mist in the air and the sentiment of the scene are all well expressed. Several of the fishermen are grouped around a crucifix with their hats off and heads bowed in prayer, and in the foreground some children are represented, who regard the scene with curiosity. This picture has been shown at the *Salon* and at the World's Fair, and received a medal at both places.

Walter MacEwen's "The Absent One — All Souls' Day" represents a young woman sitting with an open Bible in her lap, reading words of comfort to her old father seated beside her — his hands clasped and his eyes closed. In the background, in hazy indistinctness, is the figure of the mother whose memory is especially evoked by the day. A picture also Lenten in nature is one entitled "Palm Sunday," by Gari Melchers, showing a young Dutch girl dressed in her best clothes, seated with an open book, evidently reading over the verses for the day. On the wall hangs a small blue and white holy-water font, ornamented with a bit of palm, in commemoration of the anniversary. In modelling, in coloring, in correct values, and in expression of character this work is a masterpiece. J. G. Brown's picture, "Heels over Head," is a happy representation of the street arab. A sturdy small member of the tribe, evidently a boot-black, and much cleaner than members of that fraternity usually are, is in the centre of the painting, walking on his hands. A dozen other boys about him are urging him on and at the same time admiring his skill.

Two pictures of interest are those entitled "Early Moonlight, Magnolia, Massachusetts" and "An August Day — off the Coast of New York," by F. K. M. Rehn. The treatment of these works proves that the artist has an intimate knowledge of the sea, all its moods, the movements of its waves, and how the lights and shadows fall, whether of sunshine or moonlight. A very prominent animal painter, J. H. Dolph, shows a number of pictures, among them "The Dragon Fly," "The Pampered Pets" and "Always Playing." His kittens, alert, watchful and surprised, seem almost conscious of their mischievousness. The artist expresses every mood and every trait of feline life, and does it with a degree of success hardly surpassed by any other painter of kittens.

"The Barn-yard," by Horatio Walker, is one of the most artistic and altogether satisfying pictures in the collection of works by American artists. It is rather Dutch in treatment, with the exception of the clear coloring. A picture by Eugéne Boudin, entitled "Etaples, France," is a landscape with a distant view of the little fishing village which is a summer-time Mecca for so many French and American artists. One of the finest pictures in the exhibition, "La Corvette Russe," is by this same artist, and is a copy of a larger picture purchased by the French Government some years ago and placed in the Luxembourg.

"Spring in New York," showing the west side of Madison Square, is by Childe Hassam. It is an impressionist picture, but depicts admirably the tall buildings, the crowds of pedestrians, wagons, etc., in fact the general tumult and hurry-scurrying which are quite the rule in Madison Square. Mr. Hassam's impressionism is, fortunately, not the kind which makes a picture positively indistinct, but the work under consideration possesses a soft, hazy appearance and distinctness at the same time. Miss Brooks contributes four pictures to the exhibition. One of them is called "Spring Flowers," and takes its title from a sweet-faced child with a bunch of yellow daffodils pressed against her breast. Miss Brooks's "Crackers" is a clever picture showing a roguish child in a blue dress with a handful of crackers, which she is munching with great satisfaction. This picture is one of Miss Brooks's most charming works. "For Mama," by the same artist, represents a child dressed in white, with a handsomely-decorated paper-holder in her arms, evidently a present.

Leonard Ochtman has never before been so well represented in St. Louis. His large canvas, entitled "Winter Morning," showing the effect of the sunlight breaking through the clouds and falling across snow-covered fields, is certainly most artistic and beautiful. "Among the Hills" is one of his exceptionally strong achievements. In effects of atmosphere and distance and in strong, honest painting there are not many landscapes which can equal it. "View from the Great Hill" is one of Mr. Ochtman's achievements in clever composition and coloring. It describes a road leading from the foreground in shadow, except where shafts of sunlight cross it.

The City of St. Louis, is, without a doubt, about the worst-managed municipality in the country. When it is necessary for a society to be formed, the purpose of which is to govern the city over the heads of persons elected for that purpose, matters are certainly in a serious state. Such a society has been organized here lately for the purpose designated. Everything, as far as public improvements are concerned in St. Louis, is almost at a standstill. A bill passed by the State Legislature, enabling cities of over 300,000 inhabitants to pave streets, regardless of unprogressive property-owners, has been declared unconstitutional. The bonded indebtedness of the city is limited by law, and the limit has been reached. The commission appointed to devise plans for conduits for underground wires has become stagnant, in fact, has entirely disappeared. The police force is entirely inadequate. The City-hall, which has already cost $2,000,000, is left standing in an unfinished condition, exposed to the elements and weathering terribly in consequence, and the streets are improperly cleaned, repaired and paved. There seems to be a general disregard of law, order and cleanliness in the city. The smoke ordinance, compelling the installation of smoke consumers where furnaces are used, is enforced in but a half-hearted kind of way. The street railways and gas companies are allowed to tear up the streets and relay the pavement in a frightful manner. Telegraph, telephone and other poles are multiplying, together

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with the enormous cables they carry. In consequence, the Mercantile Club, which includes among its membership some of our most prominent business men, has appointed a Committee for Municipal Reform, which is to take the affairs of the city into its own hands. The men who compose the committee are in power, and it is hoped that they will accomplish something or remedy most, if not all, the wrongs we have outlined. Municipal Reform is not a mere fad in St. Louis; we do not desire to imitate New York or Chicago in crying for it, but do so because we know we have the worst governed city in the country. Disgust is expressed on all sides, and so much so that at times one feels like leaving the town and going elsewhere. Between $15,000,000 and $20,000,000 could be spent in St. Louis on public improvements that are an imperative and immediate necessity. Two hundred or more miles of streets must be paved, the City-hall must be completed, a new City Hospital must be built, as well as a Court-house and Union Market, Police, Fire and all other Departments need vast improvements. But the question is, now that the bonded indebtedness limit has been reached, Where are the necessary millions to come from? The Committee on Municipal Reform will have to answer that question. In our opinion, the first and best thing that should be done is a visit by the Committee to some well-governed municipality, like Paris or London, and a close investigation should be made of their methods of running a large city. Paris is perhaps the best-governed city in the world and there most likely the best lessons could be learned. In conclusion it must be said that, notwithstanding such handicaps, St. Louis is growing very rapidly, and we do not like to think of how much more prosperous she would be if properly governed.



EFFECT OF DISCREPANCIES IN BUILDING CONTRACT.

THE owner of the property has a right to have built the structure he contracted for, and not another. Even his caprices, if expressed in the contract, must be complied with, even though they would not have added to the value of the structure, or may have lessened its value. It is only when this plan has been substantially embodied in the work that the court can have an occasion to estimate the deficiencies. The authorities are very clear upon this point. There are a variety of cases to which the so called modern equitable rule has been applied. One is where the contractor fails to complete the structure. In such case it is said, if the contractor has done or furnished anything of which the owner avails himself, such owner may be made to pay the value of it, after deducting all damages resulting from the failure of the contractor. In such case it has been sometimes said that it does not matter why the contractor failed to perform. Another case is where there is a defect which can be remedied. Here the contractor may recover the contract price, less damages caused by the failure, including costs of supplying the deficiency. Another case is where the contractor has endeavored, in good faith, to perform his contract, and has substantially performed, but there are some unimportant defects, arising through accident or inadvertance. Here, the defects not being such as defeat or materially change the design embodied in the contract, the contractor may recover, less damages occasioned by the failure. In such case there must be a substantial performance of every material covenant in the contract, and the failure must not have resulted from design or bad faith; and whether these facts exist is a matter to be determined by the jury, or the court sitting as a jury. The spirit of the contract must be faithfully observed, though the very letter of it fail. Hence, a voluntary abandonment of the agreement, or a wilful departure from its stipulations, are not allowed. Still, if the contract is substantially kept, a failure in minor particulars — though plainly ascertainable, and patent to observation, if consistent with good faith, if not wanton or wilful will not prevent a recovery upon the *quantum meruit*.

Since the rule as to what shall constitute performance has become so indefinite, it is an important consideration, in determining whether there has been a substantial performance, that the deviations are so slight that they might have been made by one who was honestly endeavoring to comply with his contract.

Good faith, however, on the part of the contractor, is not enough. The owner has a right to a structure in all essential particulars such as he has contracted for; and to authorize a court or jury to find that there has been a substantial performance, it must be found that he has such a structure. The court cannot say that anything is immaterial which the parties have made material by their contract. One has the right to determine for himself what he deems a good foundation, or what materials he desires to be used; and, if he contracts for them, neither the contractor nor the court has the right to compel him to accept something else which may be shown by the witnesses to be just as good, or even better. No precise rule can or ought to be laid down upon this subject; but, whenever such a case arises, courts and juries should see to it that the design of the owner shall not be defeated in any important respect.

[Perry *vs.* Quackenbush (Supreme Ct. Cal.), 38 *Pacific Rep.* 740.]

OBSTRUCTION OF LIGHT.

THE easement of light and air cannot be acquired, according to the general current and weight of authority in this country, even by prescription, and of course no right to object to the obstruction of one's windows by a wall erected on the land adjoining can be said to exist. Therefore, one who leases rooms in a building is not entitled to damages from an adjoining land-owner because the latter builds so as to shut off the lessee's light on the side of the leased premises.

[Lindsey *vs.* First National Bank, Asheville, 20 *S. E. Rep.* 621.]

DAMAGES FOR DELAY IN PERFORMANCE.

WHERE a delay in completing a house is caused by the neglect of the contractor, the rental value for the period of delay may be deducted from the contract price.

[Schlachter *vs.* Hopkins (Supreme Ct. General Term Second Dept.), 32 *N. Y. Sup. Rep.* 364.]

PENALTY — LIQUIDATED DAMAGES.

A STIPULATION in a building contract that the contractor shall pay $10 as liquidated damages for each day of delay in the completion of a building should be construed as a penalty, and the owner cannot complain of the action of a court in allowing him part of his claim for delay, on the theory that it was a claim for liquidated damages.

[Collier *vs.* Betterton (Ct. Civ. App. Tex.), 29 *S. W. Rep.* 491.]

PENALTY OR LIQUIDATED DAMAGES.

A PARTY advertised for bids for a court-house, the notice requiring each bid to be accompanied by a check of $500 "as guaranty of good faith that the bidder, in case his bid is accepted, will enter into a contract," etc. One whose bid was accepted failed to enter into a contract within a reasonable time, whereupon the check was appropriated. The Court of Civil Appeals of Texas held that the money deposited was not liquidated damages but a penalty, and only so much of it could be retained as would cover the actual damage.

[Lindsey *vs.* Rockwall County, 30 *S. W. Rep.* 380.]

DAMAGES FOR DELAY.

WHERE a contractor fails to complete a building, and the owners take possession and do so, the measure of damages will be the amount of the unpaid contract price, less the fair and reasonable amount the owners had to pay to complete the work.

[Mills *vs.* Paul (Ct. Civ. App. Tex.), 30 *S. W. Rep.* 558.]

MEASURE OF DAMAGES FOR BREACH OF CONTRACT.

THE contractors in building a house agreed, for a gross sum, to furnish the entire wood for the inside finish, the wood for two rooms to be first-class mahogany. When the wood for these two rooms was delivered, the owner objected to it as not being first-class mahogany; but the contractors, insisting that it was, agreed that if the owner would use it, and it proved not to be first-class mahogany, "he need not pay anything for it." The wood upon being used in the rooms, proved to be inferior to the quality contracted for. In the action to recover the contract price for the entire job, it was held, that the owner was entitled to have deducted the reasonable value of the wood for the two rooms of the quality contracted for, and not merely the value of the inferior wood actually furnished.

[Wheaton *vs.* Lund (Supreme Ct. Minn.), 63 *N. W. Rep.* 251.]

DAMAGES FOR BREACH OF CONTRACT.

WHERE two parties have made a contract, which one of them has broken, the damages which the other party ought to receive, in respect to such breach of contract, should be such as may fairly and reasonably be considered, either arising naturally, *i. e.*, according to the usual course of things, from such breach of the contract itself, or such as may reasonably be supposed to have been in the contemplation of both parties, at the time they made the contract, as the probable result of the breach of it.

[McConaghy *vs.* Pemberton (Supreme Ct. Penn.), 31 *At. Rep.* 996.

NO LIEN FOR DAMAGES FOR BREACH OF CONTRACT.

UNDER the laws of New York, a contractor has no lien for damages sustained by him by reason of a breach of contract by the owner, but he is confined to the value of his work and materials.

[Wolf *vs.* Horn (Com. Pl. N. Y. City), 33 *N. Y. S. Rep.* 173.]



BALTIMORE ARCHITECTURAL CLUB.

THIS Club commenced its active work for the season on October 1st. It has its room in the Wilson Building, Saratoga and Charles Streets, which is always open for the use of its members, and there will be regular meetings every Thursday evening during the winter and spring. At these meetings, various subjects of

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interest will occupy the attention of the members, both of a practical and æsthetic character.

At one meeting of each month there will be an informal talk, or lecture on some of the mechanical, constructive or sanitary questions connected with architecture.

On one evening there will be sketching from the cast, and on another, an impromptu sketch *projet* to be completed in an hour. In addition to these, there will be competed for three of the larger and more important regular *projets*, such as were made last season by the Club, and for which two prizes are offered to those obtaining the first and second place in point of general merit.

During the month of November, the Club will exhibit at their rooms some twenty-five mounted drawings of a competition for a city house. These drawings are sent to Baltimore, and loaned to the Club for this purpose (as they will also be to other cities), by the *Brickbuilder* Publishing Co., of Boston, who instituted the competition a short time ago, and these drawings have been selected as among the best of those submitted. This exhibition will be open to the public, of which due notice will be given.

The present officers and Board of Control of the Baltimore Architectural Club are J. B. Noel Wyatt, W. W. Emmart, Wm. C. Nolting, Geo. Worthington, W. M. Ellicott, W. G. Keimig and Chas. Anderson.

BUFFALO CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

At the annual meeting of the Buffalo Chapter of the American Institute of Architects, held October 15, the following officers were elected for the ensuing year: William Lansing, *President;* R. A. Bethune, *First Vice-President;* W. L. Fuchs, *Second Vice-President;* L. Bethune, *Treasurer;* Ulysses G. Orr, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J.: ENTRANCE TO COURT-YARD. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

COMPETITIVE DESIGN FOR THE PUBLIC LIBRARY, FALL RIVER, MASS. MR. CHARLES H. FARNHAM, ARCHITECT, FALL RIVER, MASS.

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COMPETITIVE DESIGN FOR THE PUBLIC LIBRARY, FALL RIVER, MASS. MR. A. M. MARBLE, ARCHITECT, BOSTON, MASS.

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STATE NORMAL SCHOOL, WEST SUPERIOR, WIS. MR. HARRY W. JONES, ARCHITECT, MINNEAPOLIS, MINN.

HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J.: VIEW FROM THE SOUTH. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

NORTHEAST VIEW OF SAME, FROM THE ITALIAN GARDEN.

[Additional Illustrations in the International Edition.]

HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J.: VIEW FROM THE NORTH. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

DINING-ROOM IN THE SAME.

[Gelatine Print.]

PARLOR IN THE SAME.

[Gelatine Print.]

ALTERATIONS AND ADDITIONS TO CHAPEL, PYRGO PARK, HAVERING-ATTE-BOWER, ESSEX, ENG. MR. PERCY M. ROBERTS, ARCHITECT.

THIS chapel stands in the park, and is the private chapel of Mr. W. E. Gibb, J. P. It was originally a red brick debased Gothic structure, with wood window frames. The owner is now having these removed and replaced with stone traceried windows, which are to be filled with painted glass, and an entirely new roof to nave and chancel. The building was without a western tower. It is intended to add one with lantern and peal of bells and fine light traceried window, also to be filled with painted glass. The nave will be reseated with oak benches with carved ends.

DESIGN FOR THE HALIFAX AND HUDDERSFIELD BANK, HALIFAX, ENG. MESSRS. TARBOLTON & TUGWELL, ARCHITECTS.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CORRECTION.

CHICAGO, ILL., October 19, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I observe that in a recent issue, in connection with the illustrations of the Union Trust Building and of the Wainwright Building in St. Louis, you accredit the authorship, etc., exclusively to Adler & Sullivan. Will you kindly publish this correction, namely, it should read Adler & Sullivan and Chas. K. Ramsey, associated architects. Mr. Ramsey is abundantly entitled to this recognition.

Very truly yours, LOUIS H. SULLIVAN.

EXHIBITIONS

BOSTON, MASS.—*Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opened October 14.

CHICAGO, ILL.—*Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

CINCINNATI, O.—*Fifth Annual Exhibition of the Cincinnati Art Club:* at Closson's Gallery, October 21 to November 2.

NEW YORK, N. Y.—*Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice." also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Portraits of Bismarck by Walter Petersen: at Knoedler's Galleries.

Loan Exhibition of Portraits of Women: at the National Academy of Design, October 30 to December 4.

Drawings by C. D. Gibson: at F. Keppel & Co.'s Gallery, 20 East 16th St., October 23 to November 7.

ST. LOUIS, MO.—*Inter-Club Exhibition of the St. Louis Architectural Club:* at the Museum of Fine Arts, opened October 15.

NOTES AND CLIPPINGS

CEDAR BLOCKS STREET PAVEMENTS IN TORONTO.—There are in Toronto, according to the report of the City Engineer, 253½ miles of streets. Of these almost one-half, namely, 111 miles, are paved with cedar blocks; only 14 miles with asphalt; 36 miles with macadam. But there are 80 miles of streets without pavement of any kind. This would seem astonishing did we not remember that the city has an area of 24 square miles.—*Toronto (Ontario) Monetary Times.*

THE OLD CAPITOL IN PHILADELPHIA.—On Monday the courts, which have so long occupied the building at the southeast corner of Sixth and Chestnut Streets, will remove to the City-hall. The abandonment of the historic building will be the occasion of some formal exercises thought to be due to the associations of the structure. Judge Pennypacker has been requested to read to the judges and members of the bar on Monday morning a paper recalling the events of national importance that have occurred within the walls of this old building when it was the Capitol of the United States. After this, Court of Common Pleas No. 2, President Judge Hare, and Judges Pennypacker and Sulzberger will formally vacate the historic structure, and it is to be hoped that this precedent of tribute to its associations will be continued throughout its subsequent treatment. Not very long ago it was seriously proposed to tear this building down. Happily, that piece of foolishness or scheming will not be carried out, whatever plan may be adopted for the improvement of the square.—*Philadelphia Inquirer.*

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STATE NORMAL SCHOOL
WEST SUPERIOR, WIS.

Henry A. Foucher, Architect
Minneapolis

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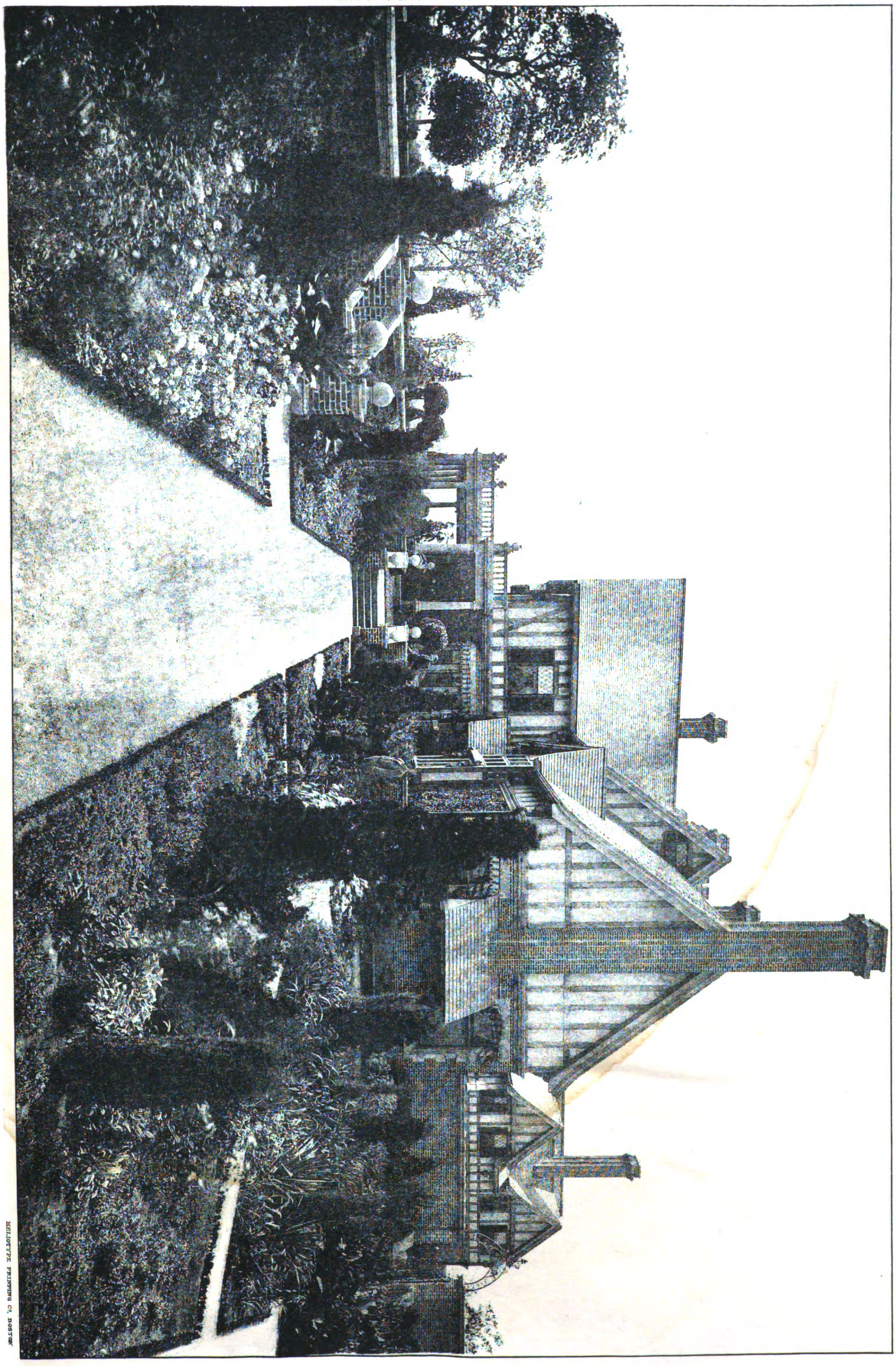
HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N.J.: VIEW FROM THE SOUTH.

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HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J.: NORTHEAST VIEW FROM THE ITALIAN GARDEN.

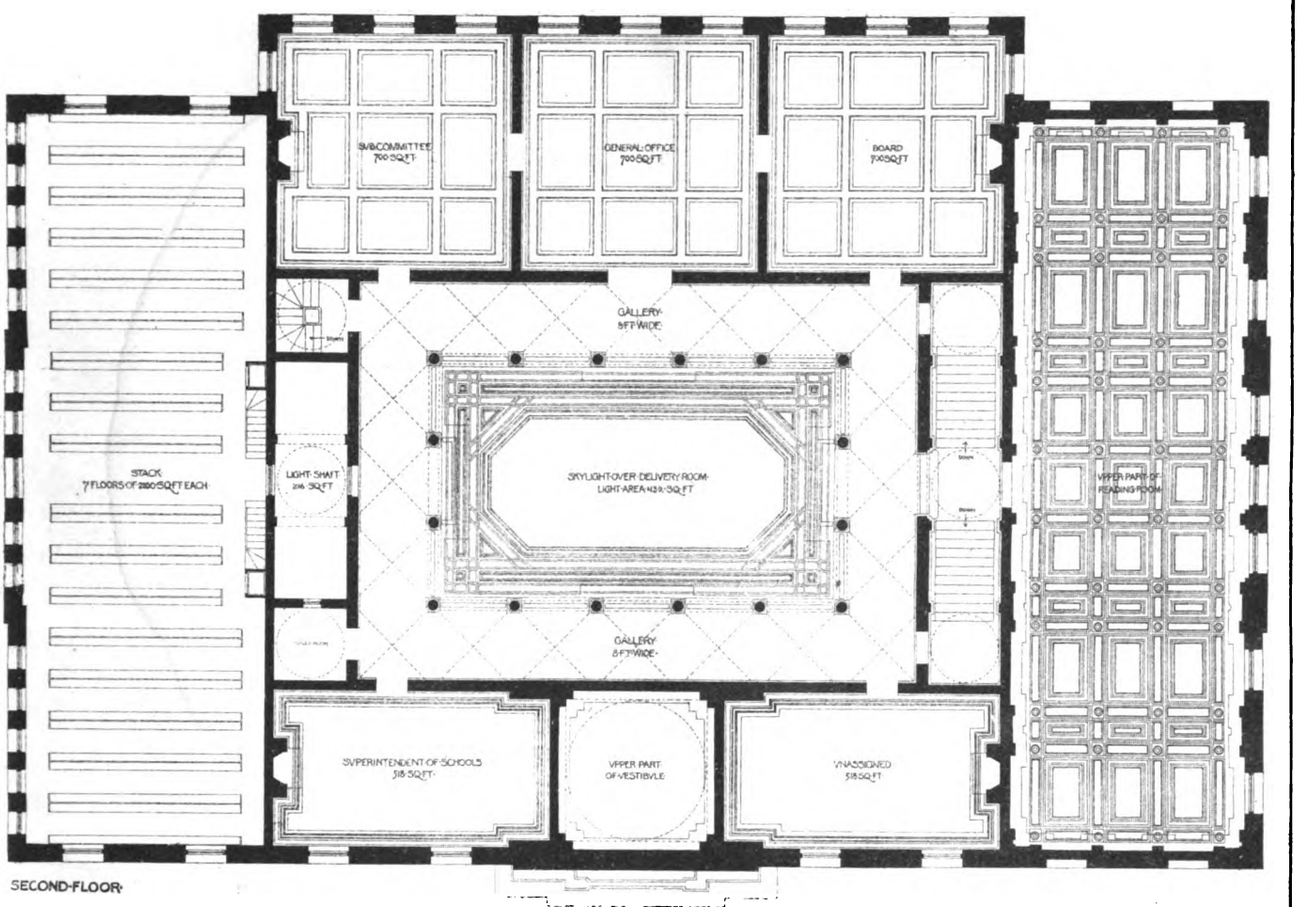
SHEPLEY, RUTAN & COOLIDGE, Architects.

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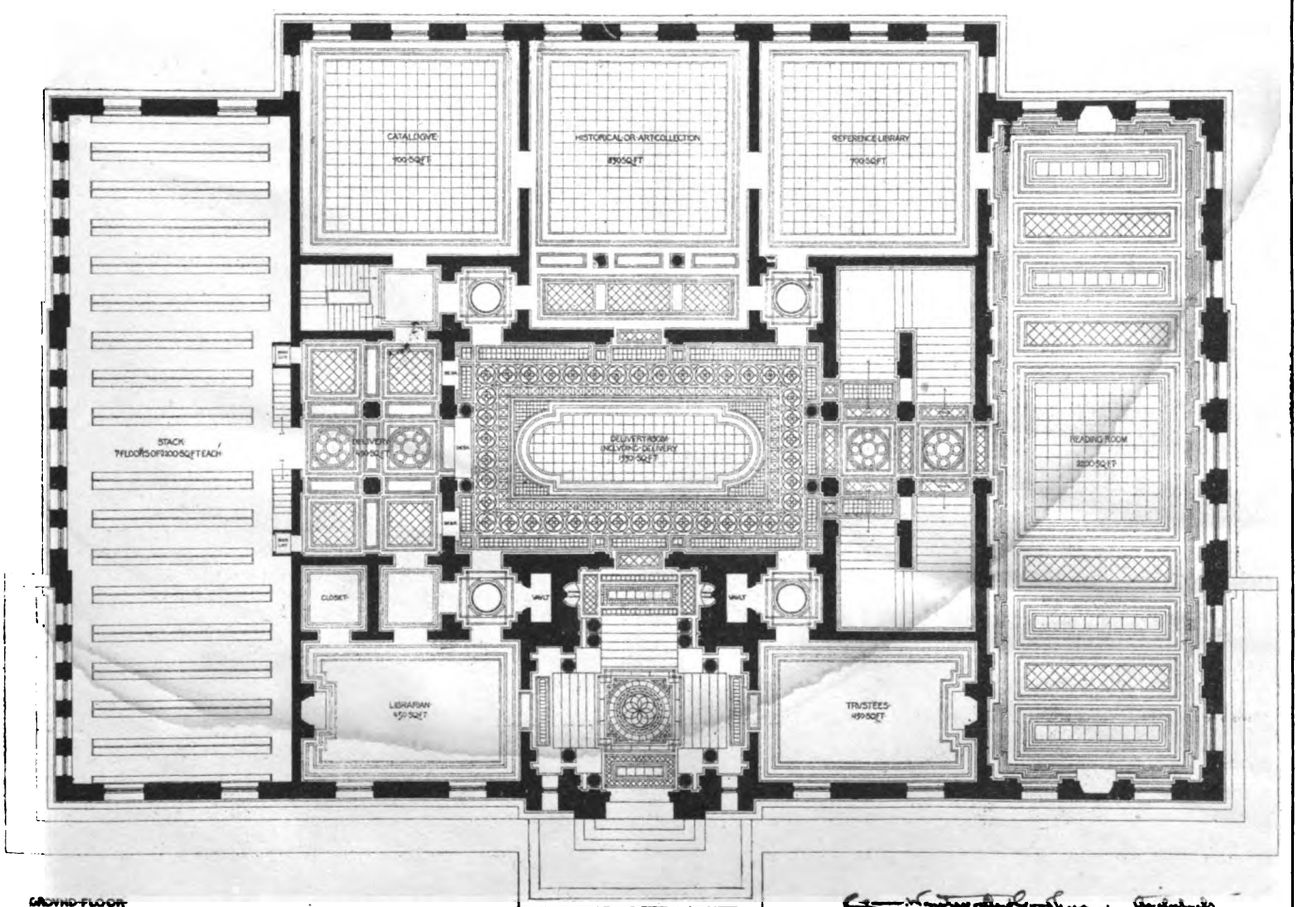
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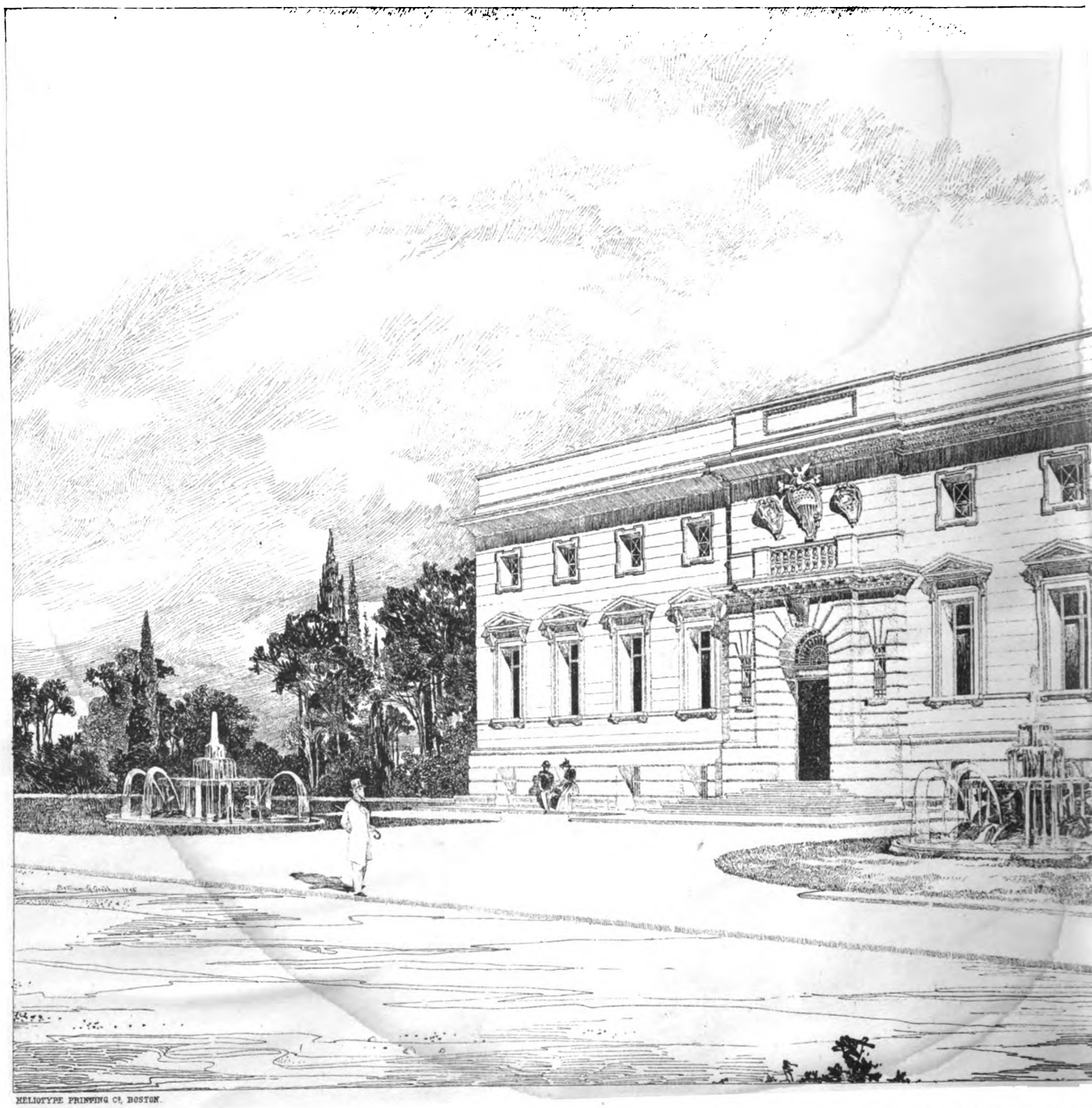
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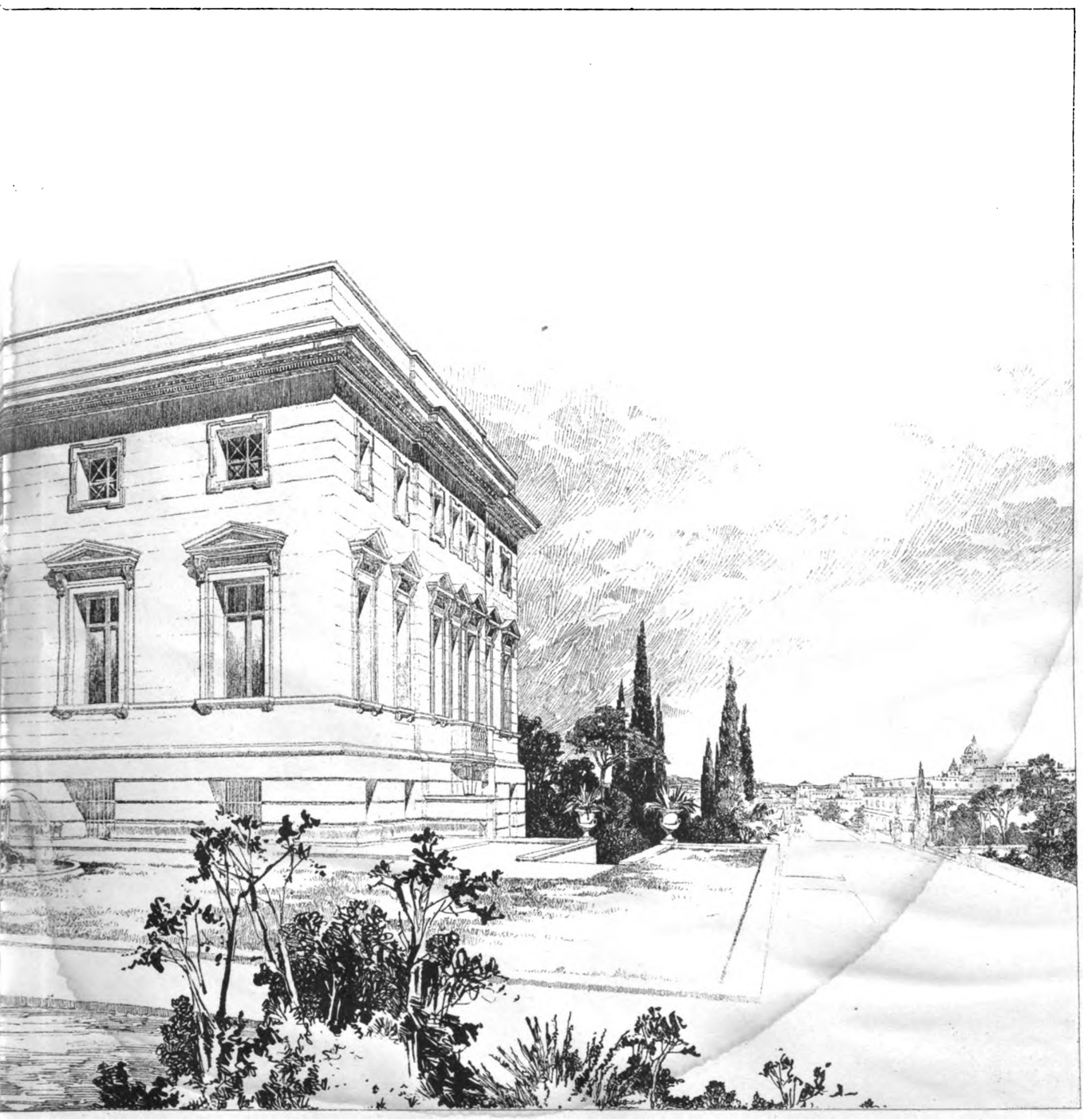


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NOVEMBER 2, 1895.

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MR. STEVENSON CONSTABLE, the head of the New York Building Department, is having a hard time between his own subordinates, whom he himself considers "criminally inefficient," and the architects and builders of the city, who suffer actual and serious damage from the slowness and inefficiency with which the work of the Department is carried on, and who, naturally, hold Mr Constable responsible for it. The latter, as his side of the matter, represents that the duties of the Department cannot be adequately fulfilled unless the appropriation for carrying it on is nearly doubled, while the architects, without knowing who is to blame, insist that the present practice, of keeping plans four or five months in the Department before they are acted upon, should be changed forthwith. Meanwhile, the Mayor, who is not likely to have any ideas of his own as to the means for remedying the trouble, and who gets no light on the subject from the experts themselves, except in the form of a proposition to spend a thousand dollars a day on the Department, very naturally hesitates to take any decided step.

SO far as the architects are concerned, it seems to us that the best course would be, now that Mr. Constable has shown where much of the trouble lies, to come to his support. There is no question that he is the best-equipped man who has, for many years, at least, been placed at the head of the Department; and, as an honest, conscientious and highly-trained professional man, he is entitled to the loyal support of all the other members of his profession. For the delays in the consideration of plans, no one really thinks him personally responsible, except in the more rigid and scientific criticisms which he undoubtedly insists on having applied to them by his subordinates; and this sort of criticism is, in the end, advantageous to the architects. That it is annoying to have to wait one's turn for criticism is evident, but the remedy for this is an increase in the force of expert examiners, rather than a return to the old ways of having plans passed with superficial or ignorant examination, or with none at all.

MR. J. H. CHAPMAN, a well-known architect of Boston, and senior member of the firm of Chapman & Frazer, died suddenly at Fredericksburg, Va., a few days ago. Mr. Chapman was born in New York, and was a graduate of Yale College. He studied in the Sheffield Scientific School, and in the Royal Academy at Stuttgart, Germany, receiving his practical training in the office of Ware & Van Brunt, in Boston. In connection with Mr. Frazer, he carried out many fine dwellings about Boston, together with the Merchants' Bank Building, at New Bedford, the Concord High School and the Episcopal Church in the same town, and the State Armory at Nashua, N. H.

THE Sixty-fifth Annual Exhibition of the Pennsylvania Academy of the Fine Arts will open on Monday, December 23, next, and close on Saturday, February 22. The Architectural Section will close February 1. Works in oil-painting, water-color, sculpture, architectural design, mural decoration, drawing, etching, engraving, stained glass, etc., will be received, and must be entered on blanks which will be furnished for the purpose, on or before Saturday, November 23, 1895, and delivered before Saturday, December 7. Collections will be made free of expense, in New York, Boston and Philadelphia, and will be returned, prepaid, to contributors in those cities. By the generosity of Mr. William L. Elkins, of Philadelphia, the Academy is enabled to offer, in connection with the exhibition, a prize of five thousand dollars, for the best picture by an American painter, not publicly exhibited previous to 1895, or, at the option of the jury, two prizes, one of three thousand, and the other of two thousand dollars, for the best two pictures. Works competing for this prize must be specifically entered, and the entry must state the price of the picture, at which Mr. Elkins is to have the privilege of purchasing any of the competing works, at any time within twenty days after the jury has made its award. The Temple, Lippincott and Smith prizes, and the Academy gold medal, will also be given as usual. Circulars may be obtained from the Secretary of the Pennsylvania Academy of the Fine Arts, Philadelphia.

SAN FRANCISCO is said to be suffering from its cemeteries, which are, as it happens, now placed on hills, to the windward of the main portion of the city, in such a position that the trade-winds from the Pacific, which blow for two months of the year, bring down among the living whatever miasm may rise from the sepulchres of the dead. A large school-house, situated near one of the cemeteries, was recently closed, on account of the repeated outbreaks of diphtheria among the pupils, and some of the physicians of the city attribute these as well as the other troubles from zymotic diseases, to the air from the graveyards. We do not remember having heard diphtheria before attributed to cemetery exhalations, but it is quite possible that it might be caused by them, and the people of the city are quite justified in urging, as they are now doing, the prohibition of further interments within the city limits, and even the removal of the bodies from the cemeteries already existing. Although the latter would be a rather serious undertaking, it is not likely that diphtheria will diminish much until it is accomplished. Few people have any idea of the time during which noxious and corrupting substances, buried in the ground beyond the reach of the nitrifying microbe, will continue to saturate the earth, and the surrounding atmosphere, with foul vapors. It is commonly assumed that within a few months, or a few years, at the utmost, the products of decomposition are absorbed by the soil, and converted into harmless inorganic substances; but Professor Lanciani tells us that under his direction, trenches were dug in the gardens of Mæcenas, which were made about the year 40 B. C. by filling-in twenty-five feet of clean soil over an old cemetery on the Esquiline hill in Rome. The cemetery had long been a nuisance and danger to that part of the city, and Mæcenas earned the gratitude of his contemporaries by buying it, and covering it up. Nevertheless, after two thousand years of disuse, and exposure to such purification as a good covering of clean soil could effect in it, Lanciani found it necessary, when his men had reached the bottom of the earth-filling, and exposed the ancient surface, to relieve them at short intervals, in order that they might escape suffocation from the horrible stench which proceeded from the remains of the people whose bodies were laid there long before the Christian era.

THE well-known Fairbanks house, at Dedham, Mass., which was built about 1636, and is, therefore, one of the oldest houses in the country, was recently offered for sale by its present owner, Miss Rebecca Fairbanks, but was promptly

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secured by a public-spirited citizen, Mr. John Crowley, who has arranged to turn it over to the Dedham Historical Society. The house itself, which we illustrated some years ago, is an unpretentious structure, prettily situated in a group of old elm trees; but a house that was built ninety-six years before George Washington was born is a curiosity, even in New England, and it is the object of much local interest. As the estate had been in the hands of one family for two hundred and sixty years, small objects of much historical interest had been accumulated in it; and it is hoped that these may pass, with the house, into the hands of the Historical Society.

LE GÉNIE CIVIL comes to us in mourning for the late M. Pasteur, of whom it gives a very interesting and sympathetic biographical sketch, by M. Charles Talansier. Every one knows the principal features of Pasteur's career, but M. Talansier adds many details. It seems that Pasteur, who was an enthusiastic and learned chemist, was engaged, at the age of thirty-two, as professor at Lille. In thinking in what direction he could make his work most valuable to his new employers, he reflected that Lille was the centre of a great brewing and distilling business, and decided that an investigation into the obscure subject of fermentation would be, perhaps, more likely than anything else to be of service to this interest. It was in this way that his attention was drawn to inquiries, which he continued to pursue after his removal from Lille, which occurred a few years later, and which led him to discoveries which have made his name immortal. On his return from Lille to Paris, he was made professor of geology, physics and chemistry in the School of Fine Arts, and director of scientific studies in the Normal School. His discoveries in regard to ferments and fermentation were, however, already noted among scientific men, and, in 1865, the great chemist, Dumas, persuaded him to establish himself for a time in the South of France, to study on the spot the "pébrine," or silk-worm disease, which threatened to ruin the principal industry of several districts. After years of labor, he satisfied himself that the pébrine, as well as another disease of silk-worm, known as "flacherie," was due to a microscopic organism, belonging to the class now known under the name of bacteria; and, by studying the growth of this organism, he ascertained that it was transmitted through the eggs of the insect. He published the results of his investigations and showed how the infected eggs in a brood could be distinguished by the microscope, and destroyed, leaving only the sound eggs for propagation. This mode of escaping the disease proved completely successful, and the silk-raising districts soon regained their prosperity.

IN everything that he did, Pasteur's passion was for utility. Whether he investigated the fermentation of beer, or the diseases of silk-worms, or the grape-vine blight, or hydrophobia, he thought immediately of some way of making his discoveries practically useful. In the early days of his study of fermentation, he ascertained that the microbes which cause injurious changes in beer were destroyed by a temperature of about 140° Fahrenheit; and he recommended that to prevent beer from becoming sour, or acquiring a bad taste, the must should be cooled out of contact with air, or the bottles, after filling with beer, raised to a temperature which would destroy the ferments. His advice was followed by brewers, with such success that bottled-beer is now subjected, on an immense scale, to this process, which is known in the breweries, all over Europe and America, as "Pasteurization." The ardor with which the studies of the great chemist had been pursued in the silk-worm district brought on an attack of apoplexy. He was then only forty-six years old, and he recovered from the disease, but he was for two months entirely paralyzed, and never recovered the full use of his limbs. This mishap did not, however, interrupt seriously his noble career. As soon as he had strength for study, he began the investigation of the "chicken-cholera" disease, which he soon found to be produced by a microbe. This microbe he succeeded in isolating, and cultivating; and, in some way, it seems to have occurred to him that the cultivated microbe might be used for preventive inoculation, just as the small-pox virus, attenuated in certain ways, serves to protect against the original disease. His experiments were completely successful, and the attenuated cholera microbe, used for inoculation, protected the chickens inoculated with it from subsequent infection, and even from the effects of inoculation with the virus of normal strength. It was, however, to men, not chickens, that Pasteur wished his work to be of service, and he soon began to apply the knowledge that he had gained with the chicken-cholera virus to one of the most terrible of all infectious diseases, the "carbuncle" of sheep, which not only decimates the flocks in certain localities, but infects and kills the shepherds. The microbe of the carbuncle was soon discovered, and cultivated and attenuated, as that of the chicken-disease had been, and used for inoculation in the same manner, and with similar results. During all this time, Pasteur's discoveries had been attacked and derided by various persons, and, whether by chance or design, the carbuncle investigation gave him an opportunity for a striking demonstration of the truth of his assertions. The Agricultural Society of Melun, which was greatly interested in his work, offered to supply him with material for a public trial, and he accepted. Fifty sheep and ten cows were placed at his disposal. Twenty-five of the sheep, and six of the cows, were twice vaccinated with the attenuated virus of carbuncle. About three weeks later, when the vaccination should have accomplished its work, all the sheep and cows were inoculated with the carbuncle virus in its full strength. Pasteur predicted that the vaccinated animals would not be affected by the inoculation, and that all the sheep which had not been vaccinated would die. Two days after the inoculation, more than two hundred people visited the farm, to see if the predictions had been fulfilled. They found, of the twenty-five unvaccinated sheep, twenty-two already dead with carbuncle, and two dying; the last died the same evening. The unvaccinated cows were all sick with an intense fever, and could not eat. All the animals that had been vaccinated were in perfect health, and peacefully feeding in their pasture. This experiment created great enthusiasm. A veterinary surgeon, who had doubted the reality of Pasteur's discoveries, insisted on having himself vaccinated for carbuncle; and many others of his profession, who had been incredulous, became warm advocates of the new treatment, so that, at present, hundreds of thousands of sheep and other animals are brought every year for vaccination. The next subject of Pasteur's investigations was hydrophobia, and every one knows the results to which his experiments led. He seems, himself, to have regarded his method of treating this disease as his most important work, and the "Institut Pasteur," in which the treatment is administered in Paris, became the scene of all his later labors, and is now, by his own desire, the place of his burial.

DR. SCHWEINFURTH writes to the *Zeitschrift für Aegyptische Sprache*, complaining of the reckless way in which exploration for antiquities is now carried on in Egypt. As he says, the country is being ransacked to find striking objects to attract visitors to the Gizeh Museum, while articles of modest appearance are thrown aside by the ignorant natives who are often employed to make the excavations, and who, it is needless to say, have not the faintest notion of the importance of keeping the articles discovered together, or of recording the positions and relations in which they are found. In this way, as he says, seeds of plants, and stones of fruits, found in the tombs, which might cast light on the early history and the commercial relations of the Egyptians, are irretrievably lost. It seems to be impossible to secure scientific supervision of operations carried on so extensively as are now the explorations in Egypt; and he thinks that the only way to prevent the loss of much valuable material is for the Gizeh Museum to stop excavating on its own account for the present, and devote itself to the supervision of the work carried on as a pecuniary speculation by dealers, and to the preservation of existing monuments.

THE severe storm which visited Southeastern Massachusetts a week or two ago caused some damage to buildings. In Woonsocket, an old mill, built in 1840, and occupied by the Woonsocket Electric Machine and Power Company, was undermined by the overflow of the flume which ran through it, and a portion of the rear wall fell, causing a loss of about five thousand dollars. In Pawtucket, near by, a portion of an interior wall of the new High School, which had been carried up a story above the exterior walls, was blown down, causing a little damage.

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THEATRES.[1] — XXII.

EXETER THEATRE.



Plan of Exeter Theatre.

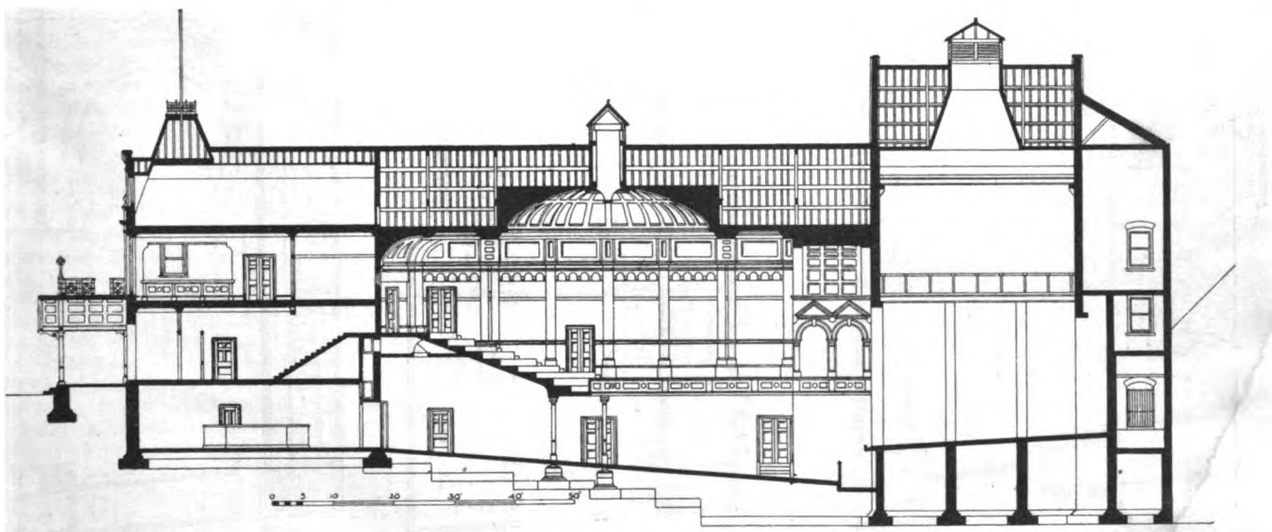
THE last great fatality in theatre fires which occurred in England was the historical Exeter fire. The architects who were selected to design the building to succeed the one thus destroyed were the firm of Messrs. Darbyshire & Smith of Manchester.

Mr. Alfred Darbyshire, F. S. A., F. R. I. B. A., of that firm, has placed at my disposal the drawings of this building and he has also furnished me with some notes of his upon theatre construction and planning. It is particularly interesting to follow the reasoning in the mind of the architect when examining and dealing with his designs. I shall therefore, prior to my detailed description of the Exeter Theatre, refer at some length to Mr. Darbyshire's own words.

After describing the particular circumstances which governed the planning of the theatres of the ancients, he points out that the pantomimes and dramas of those days did not require thousands of artificial lights and other dangerous and sensational aids of the modern stage, and that hence the safety of human life did not constitute an element in the construction of gladiatorial arenas or theatrical auditoria. It is patent to all that this class of building amongst the present generation of architects presents a problem with which the antique builder had not to grapple and the solution of which is only now receiving the anxious attention of theatre designers and of those public authorities in whose hands the future safety of the public lies.

Dramatic representation necessitates a building of two separate and distinct parts, one for the audience — the auditorium — and the other for the performers — the stage.

This division has existed from the earliest times of dramatic entertainment. It was found in the theatres of the Greeks, although the "Chorus" was located in the auditorium, and it was realized in the first theatre of the Romans built by Pompey, and in the Great



Theatre of Marcellus, the ruins of which are still to be seen in the city of the Seven Hills.

The difference between the amphitheatre and the theatre must be borne in mind: in the former the performers occupied a central *arena* round which the seats for spectators rose, tier above tier; in the theatre the performers occupied one end, or side, of the edifice, the seats being raised as before, but in a semi-circle in order that the spectators might face the actors, and as it was necessary both to see the facial expression and to hear the voices of the performers, the theatre was of much smaller dimensions than the amphitheatre.

Now the planning of the ancient theatre, as far as regards the relative positions of stage and auditorium, has been carried out in modern theatres, the difference being that the audience are placed on several galleries, one above another, instead of on one continuous gallery. It is evident that by this arrangement the occupants of the second, third or fourth galleries are seated at a considerable height from the ground, hence the difficulty of escape from the theatre in case of fire, and hence the awful unrehearsed tragedy too often enacted in modern theatres.

The lamentable disasters which have happened both in Continental and English theatres have aroused a painful interest in this class of buildings, and much thought has been devoted to what may be called safety planning.

To many persons who have not looked into this matter, it may be a surprise, says Mr. Darbyshire, to be told that the loss of life in a fire panic is not owing to fire or to actual contact with flame, but to asphyxiation or suffocation by inhaling the poisonous gases given off during conflagration. At Exeter the poor creatures sitting in the gallery never left their seats, for when the cloud of poison burst from the stage it instantly ascended, enveloped them and left them still sitting as at the play, but so many rows of ghastly corpses, instead of the merry human beings who had shortly before entered that theatre full of health and strength.

This awful episode in the Exeter fire has taught us many lessons; it has given us certain knowledge in theatre fires. The initial condition of theatre planning is that in the future these buildings must stand completely isolated from other property and if suitable sites cannot be obtained, then Mr. Darbyshire says, let us hope that the controlling authorities will prohibit the building. It will easily be seen that this condition of isolation will enable an audience to escape from all sides of an auditorium.

The second condition of importance, put forth by this authority, is that the stage shall be instantly isolated from the auditorium by the closing of the proscenium-opening. All fires originating on the stages must have their asphyxiating fumes confined to the place of their origin.

The third condition is that the highest point accessible by an audience should be as near to the streets as possible, and no seats should be higher than the proscenium-opening. This is only necessary in case the means of stage isolation should fail.

Fourthly, every part of the house should be provided with two exits, communicating separately and directly with the streets, and having no openings in them except at the top and bottom.

Mr. Darbyshire advocates, as a fifth condition, that a fireproof roof should be provided for the stage, with a large smoke-shaft glazed and louvred. In case of fire, the proscenium-opening being closed, both flame and smoke will at once make for this shaft.

The sixth condition is that every space upon which the human foot is planted in the auditorium and escape-staircases, must be absolutely fireproof and unburnable.

The foregoing conditions apply to the safety of the public, but it is quite possible to equally provide for the safety of the artists and persons employed in the theatre.

It is remarked by this architect that many persons will say that these conditions will constitute a mere and impracticable theory. To such an allegation he asserts that "They have now become actual facts. . . . When called in to rebuild the theatre, at Exeter," he goes on to say, "it was with some fear and trembling that I undertook the task. The grand old city had received a shock, and its inhabitants were still in mourning over a disaster which seemed destined to hang over them like the shadow of death. Thanks, however, to the determination and energy of those interested, I was permitted to carry out the safety plan, which I had worked out at the suggestion of my friend, Henry Irving, with the result that the good people of Exeter go to their theatre with the utmost confidence and with the certain knowledge that they cannot be destroyed."

It will be interesting, after these expressions of Mr. Darbyshire's views upon this subject, to follow Mr. Irving and Mr. Darbyshire's scheme for the safety theatre which has been mentioned above and which formed the model for the house which is the subject of my illustrations.

The plan for this scheme was formed upon the assumption that an isolated site could be obtained, but if circumstance made the acquisition of such a site impracticable, then the area devoted to the theatre proper would have to be reduced, so as to secure carriage-ways all around, or, at all events, ample room for the people to disperse when coming out of the house. External balconies over these avenues were contemplated, affording additional refuges for the occupants of the dress and upper circles.

The building would be only one-story high; the lofty gallery would disappear, and the people paying gallery prices be placed on the ground-floor behind the pit, in front of which would be the stalls. Although the gallery people would be thus placed at a distance from

[1] Continued from No. 1032, page 8.

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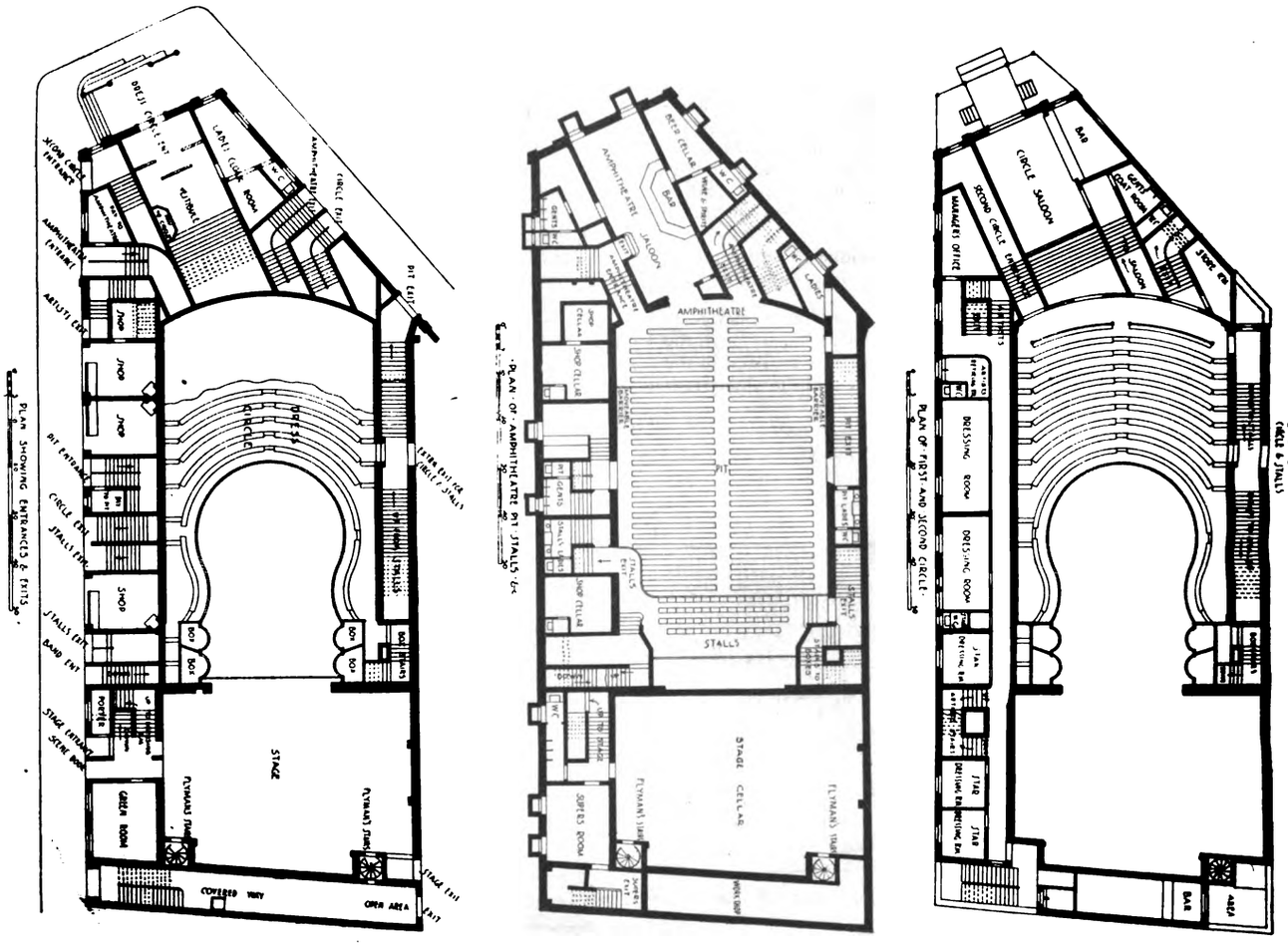
the stage, they would view the scene without looking down upon the heads of the performers. This view would be obtained by raising the balcony sufficiently high to allow the persons at the back of the pit to be on a line of sight with the stage, so as to command from one to two-thirds of the proscenium-opening.

The single story of the theatre in this scheme would be devoted to the dress and upper circles, which would be reached by straight staircases communicating directly with the street, and attaining no more at their utmost height than twenty-four feet from the ground. The facility of access and egress that would be thus provided seems all that could be desired, both in extent and directness. There would be no openings in any staircase except the direct one from the auditorium.

The seats in the "safety" scheme would be all arranged on the segments of a circle and divided longitudinally and transversely by gangways three feet wide. The dress-circle and upper circle, which would be placed on the same tier behind the dress-circle, would each have an entrance and an exit staircase on opposite sides of the opposite side of the auditory into the street. The pit has an entrance on one side, an exit on the other, while the back-pit, or amphitheatre, is similarly provided with means of ingress and egress. The upper circle entrance and the two separate exits are placed in the same manner in either of the side streets.

It seems a pity that in the side of the theatre facing Longbrooke Street, that part of the site has been taken up with shops, although ample exits appear to have been provided, yet, to dovetail shops in between such exits cannot be commended, for should a fire occur in any one of the shops, some of the smoke therefrom would be sure to find its way into the exit passages and staircases and perhaps cause alarm. A theatre is better when it is an entire building of itself, with no added risks whatever. It is the more surprising to find shops in this case when Mr. Darbyshire's views on theatre planning have been ascertained to be so well founded.

Over these shops and over the various exits extend for nearly the full length of Longbrooke Street, the dressing-rooms on the first floor. There are separate entrances for the stage, the musicians



building. Corresponding provision would be made for the occupants of the ground floor.

There would be no fireplaces, hot-air flues being used for warming purposes. The illuminating power would be solely by electricity, and the proscenium-opening would be closed by an asbestos curtain.

Having now seen what the architect proposes in theory, and having heard his views, let us examine what he has done in practice to carry out such theory and views in the rebuilding of the Exeter Theatre.

The Exeter Theatre is on an isolated site. The auditorium consists of one tier only above the pit, which latter is sunk below the level of the street, so that the highest seat in the house is only fourteen steps above the street-level, and the seats at the back of the pit are but ten feet below the pavement.

The seats on the area-level are divided in accordance with the Irving-Darbyshire scheme into stalls, pit and back-pit seats, or, as they are called on the plans, amphitheatre, while the tier consists of dress-circle and upper circle.

The circle comprises ten rows of seats, the back row being, as I have said, fourteen steps above the street, but the exit on one side is only five steps higher than the public thoroughfare. The stalls are entered from the main-entrance vestibule and approached by two flights of steps, the number of steps in the lower flight being rather many, but the same objection to a crowd rushing up stairs does not exist as that to a crowd going down stairs, for, in the latter case, they are more likely to fall and block up the exit with a human barrier. There is not the same risk in people ascending a staircase.

In addition to the stalls-entrance, there are two direct exits on the and the scenery at the side of the stage, and an additional exit staircase from the dressing-rooms at the end farthest from the stage. The supers, the flymen and the scene-painters are all provided with means of escape by stairs at the far end of the building.

The saloon, offices, cloak-rooms, etc., are situated in the front over the entrance vestibule.

The following are some of the leading dimensions scaled from the drawings:

Width between walls of auditorium	44 feet.
Depth from curtain line to back wall of auditorium	82 "
Depth from curtain line to circle front	48 "
Height from pit floor to crown of dome	46 "
Width of proscenium-opening	25 "
Height of proscenium-opening	25 "
Width between walls of stage	52 "
Depth of stage	37 "
Height from stage to gridiron	44 "

E. A. E. Woodrow.

[To be continued.]

St. Savior's Church, Moscow. — The Temple of St. Savior, completed in 1883, cost some ten millions of dollars, and holds seven thousand people. It has four belfries, each with a golden cupola, and over all a central dome ninety-eight feet in diameter. It stands in a great square with beautiful gardens of flowers on each side. It is entered by granite steps, under a porch supported by thirty marble columns, and over one of the bronzed doors, rich and elaborate, is the inscription, "God with us." The inside is far more light, airy and cheerful than St. Isaac's, its services equally if not more imposing, its priests, if possible, more gorgeously apparelled. — *The Congregationalist.*

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RICHARD MORRIS HUNT.[1]

At the request of those whose wishes I am bound to respect, the honorable duty of formally commemorating the life and professional career of our brother, Richard Morris Hunt, third President of the American Institute of Architects, has devolved,— unworthily, I fear,— upon me.

But, in fulfilling this duty, there is nothing to be condoned; there are no prejudices in your minds to be laboriously overcome, no facts to be ingeniously suppressed, nothing to be exaggerated or justified by the art of the rhetorician. The career which we are about to celebrate was one so open, so conspicuous, so fortunate and complete, the personality which made it possible was so candid, so vigorous, so gracious, so accomplished, that this Institute, identified with it from the beginning, is eager to welcome all that can be said in its praise. I submit to you, therefore, no perfunctory panegyric, but the unaffected impressions of a man, singularly representative of all the best qualities which can adorn an architect and a gentleman, a man to whom the profession in this country for its own sake owes a formal tribute of commemoration and acknowledgment, a man who not only won our respect and admiration for what he did, but our affection for what he was.

The Angel of Death cannot destroy a full and true life; rather does he preserve it. He confers upon it that symmetry, unity and completeness which remain with us always to quicken and inspire. He purges it of all accidental and unessential elements, and makes a visible and enduring monument of its virtues. The dread Architect has thus rounded off and made beautiful for us forever this large, brilliant and blameless career. But we, brothers in the craft which this career illustrated and adorned, heavy with a sense of a bereavement which seems irreparable, cannot but grieve that it has closed, and that the living man, whom we admired and loved, we shall no more see or hear. Irreparable, did I say? Not irreparable, so long as we continue to measure ourselves by the high standard of professional conduct which he established, so long as the spirit of serious and tranquil beauty which pervaded his works shall continue to exercise prolific power in the architecture of the New World. For it is the greatest felicity of the masters that what was best in them enjoys blessed immortality in their works and remains to keep alive the divine fire of art.

Those rare qualities in the master whom we now commemorate, which created that peculiar personal affection of which I have spoken, can hardly be made real to those who never came in contact with him; but the genius and training of the man, which expressed themselves in concrete form, can perhaps be so celebrated that those who follow us may, like ourselves, light their torches at his shrine. We, who have been near to Hunt, find it difficult to separate the man from his works. To us they together constitute a unity so full of distinction and character, so pervaded and inspired by art, that no history of the development of our architecture in the latter half of the nineteenth century would be possible without a recognition of it as one of its most potent factors.

One of the wisest of men has said that there is something even in the most obscure and humble life, which, if it could be revealed, would be of the utmost interest and value to all mankind. Surely, in the noble and conspicuous life which we are now considering it should not be difficult to uncover this precious germ.

I shall not here attempt a detailed biography of Richard Morris Hunt with all the dates, all the incidents, accidents, honors and accomplishments of his varied career, though the necessity for such a fulness of record is already keenly felt and doubtless will be duly satisfied while the memory of them is yet green and fragrant in the great household of his friends. In the brief time at my disposal I shall only try to account for those qualities in the man which made him dear to us, and which are necessary to be commemorated by this Institute as a part of the history of contemporary architecture.

He was born at Brattleboro, Vermont, October 31, 1828. He died at Newport, Rhode Island, July 31, 1895. In three months more the full measure of his life would have been sixty-seven years. He was the fourth of the five children of the Hon. Jonathan Hunt and of his wife, Jane Maria Leavitt, both descended from old New England stock. His father, a gentleman of ample means and high consideration in Vermont, represented that Commonwealth in Congress from 1827 to 1832, and died in Washington while in the public service. The education and training of the young children thus fell into the hands of the maternal grandmother, whose gentle influence was all for sweetness and light, and of the mother, who, fortunately for them, fortunately, indeed, for the future of art in America, was a woman of high spirit, great force of character, and of accomplishments far in advance of her time. She made her own ambitious ideals the standard for them; to their best culture she devoted herself with peculiar energy and sound discretion, and her old age was crowned with their success. She lived to see two of her sons, William and Richard, *par nobile fratrum*, recognized by the civilized world as the most conspicuous and most imposing forces in the development of our national art, the one in painting, the other in architecture, and both as the most lovable and most fascinating of men.

Richard's earliest training was mainly in a private school in New Haven, and in the public schools of Boston. But he was only fifteen years of age when the family moved to Europe and took residence in Geneva, where, following that inborn instinct for art which responds so generously to culture, he studied architecture and drawing for five years in the atelier of Samuel Darier. This experience determined his career, and in 1848 Richard confirmed it by entering the École des Beaux Arts of Paris as an *élève* in the atelier of Hector Martin Lefuel, who thus became his patron. The influence by which he has been surrounded in those happy years of pupilage, the atmosphere of generous emulation which he breathed, the ardent friendships which he formed, apparently converted this spirited American lad into a Frenchman. But beneath the gay and impulsive exterior of the Parisian, the solid good sense of his New England stock held him steady and strengthened and confirmed his artistic conscience. This was enlarged and educated by extensive travel in the East and, indeed, throughout the whole world wherever art had left a mark. Never has travel borne richer fruits or inspired a more receptive or more eager mind.

There were six of these abundant years of study and travel for the brilliant young American, and when his patron, Lefuel, was appointed to succeed Visconti as architect of the new works on the Louvre, by which Napoleon III desired to make fitting monumental record of his reign, he procured for his favorite pupil a government appointment as Inspector-of-works, and in that capacity gave him supervision over the construction of the Pavillon de la Bibliothèque. He was only twenty-six years of age when he entered upon this important duty and he amply justified the singular confidence reposed in him. There is a certain picturesque surprise in the spectacle of a Yankee lad giving form and character to one of the imperial monuments of France. Lefuel, of course, was the responsible architect of this, as of all the other new works of the palace, but, while providing for the unity of the masses of buildings composing it and for the proper maintenance of the national traditions in this great historical monument, he knew how to use the abilities of his subordinates to the best advantage in developing the details. In a letter to Mrs. Hunt, written in 1867, he said: "My greatest work was done while dear Dick worked with me, and he can justly claim a great share of its success. I do not hide from you those circumstances of which his own modesty does not permit him to speak." This semi-independent position was the opportunity which the ambition of Hunt most needed and most ardently desired. It gave him practical experience in a work illustrating on a great scale just those qualities of academic architecture most congenial to him, and it is a pleasure for us, his pupils, his friends and countrymen, to observe that the part of the new Louvre most remarkable for elegant reserve and temperance of expression in the midst of the most seductive temptations to prodigality which the resources and traditions of the national architecture could present to an enthusiastic nature like that of Hunt, is certainly the Pavillon de la Bibliothèque.

In 1855, in his twenty-seventh year, after an education and training such as no American architect had before or, indeed, has since enjoyed, Hunt returned to his native land, accredited as an ambassador of art from the abounding wealth of the Old World to the infinite possibilities of the New. Desiring to become familiar with the methods of work prevailing at home, he immediately sought and obtained employment with Thomas U. Walter, afterwards the second president of this Institute, and then architect of the Capitol extensions at Washington. After six months of this service, he returned to New York and began the independent practice of his profession.

This beginning was, as usual with all beginnings, small, uncertain and beset with disappointments. The New World was not then hospitable to such high ideals, such noble enthusiasms, as this first American thoroughbred brought with him from the schools of Paris. He found himself an exile in his own country, and, if he had not been inspired by a patriotic ardor and hopefulness which possessed his whole heart to the end, he would more than once have been tempted to listen to the ardent entreaties of his old comrades in art, who, with sympathetic affection, were eager to welcome him back to the more congenial atmosphere of the Old World. There, doubtless, he could have made for himself a great career, for the architecture of France knew that it had lost in this young aspirant, one of the most vigorous and brilliant personalities which for many years had appeared in its schools. But his natural loyalty was unshaken, and he stayed because he loved his country and because he modestly believed that, sooner or later, he could do something to direct a part of its crude but tremendous energy to the service of beauty and truth in art.

At this point began my own association with Hunt, and I trust that what I have to reveal concerning this association, and what this association revealed to me, may be the excuse for the personal element which must now enter into this brief narration.

Those of us who were fortunate enough to be placed under the immediate influence of Hunt, as his pupils, will never forget either the wealth of his resources or the inspiring nature of his instruction. These resources were placed at our disposal with a most lavish hand, and, under the vehement and strenuous manner of the master we quickly discovered the truth and tenderness of his heart. The study of architecture at that time was pursued under the most discouraging conditions. The art was ill-understood and, indeed, hardly respected by the public. There were no schools in which it was

[1] A Memorial Address by Mr. Henry Van Brunt, F. A. I. A., of Kansas City, Mo., delivered at the Twenty-ninth Convention of the American Institute of Architects, at St. Louis, Mo., October 15–17, 1895.

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recognized as a desirable subject for study. There were but few books available and our traditions were eminently provincial. Examples of good work were so rare that our ideals of perfection were incoherent and doubtful, and were swayed, now in one direction and now in another, by the literary warfare then prevailing between Gothic and Classic camps. Mediævalism was sustaining itself by the religious ardor of Pugin and the brilliant rhetoric and poetic imagery of Ruskin. Sentiment was keenly aroused, but discipline was silent. But, though the atmosphere was thick with prejudice and controversy, there was an intellectual movement in the midst of it exceedingly attractive to young men of education and artistic instincts.

In the autumn of 1858, three earnest aspirants for architectural knowledge applied to Hunt, who had then just completed the Tenth Street Studio Building in New York, to take one of the studios himself and install them there as his pupils. One of these applicants, our present honored vice-president, Geo. B. Post, had just graduated from the Engineering School of the New York University; the other two were Charles D. Gambrill and myself, who, since their graduation at Harvard four years before, had been pursuing the study of architecture under the somewhat discouraging conditions which then prevailed.

It is due to our dear comrade Gambrill to state here, as a part of this story, that subsequently he entered into two successive partnerships, one with Post and one with Richardson, and that his untimely death, interrupting a career of singular promise, was a loss, not to his friends only, but to the architecture of America.

With the noble generosity of the true artist, Hunt granted our request and equipped one of the studios for our use. Early in the following year we were joined by Wm. R. Ware, now one of the most honored and best beloved names in the history of American architecture, and subsequently by Frank Furness, our comrade from Philadelphia, and by Edmund Quincy and E. L. Hyde, who never practised our art. Thus we together entered upon an era so rich, so full of surprise and delight that it seems as we look back upon it, as if once more in the world the joy of the Renaissance, the white light of knowledge, had broken in upon the superstitions of romance. To us it was a revelation and an enlargement of vision so sudden and complete that the few years spent by us in that stimulating atmosphere were the most memorable and eventful in life. But if the disciples were glad to learn, the master was generous to teach.

His own studio and home at that time were in the old University Building, on Washington Square. Here he lived as bachelor in spacious and lofty apartments, filled with the spoils of foreign travel. Here were carved antique cabinets, filled with bronzes, medallions, precious glass of Venice and curiosities of fine handiwork in all the arts. The walls were rich with hangings, old panels, sculptured or painted, and modern studies from the studios of Paris. These, together with mediæval missals and embroideries, instruments of music, masterpieces of forged and wrought metal work and of faïence, strange and costly toys of every era of civilization, brought into the great chamber the mellow atmosphere of the Old World. More than all this to us was Hunt's noble and inexhaustible library, by far the richest, most comprehensive and most curious collection of books on architecture and the other fine arts which at that time had been brought together in the New World. I doubt if even now this precious library is exceeded in some respects by any of the more modern public collections.

To these treasures the fortunate pupils were welcomed with boundless hospitality. Indeed, Hunt's attitude sometimes made us feel that he considered the labor and cost of bringing them together justified in the light which they shed upon us. For myself I can truly say that the hours spent in the gracious seclusion of that dim chamber were the most fruitful in my life. The aspect of every page, the emotions of every revelation of the world of art come back to my memory clear and distinct as I speak in gratitude and affection.

Our own workshop in the Studio Building was hung with cartoons in colors, and furnished with casts of architectural and decorative detail. Even that working-place was not without its ancient carved chimney-piece and its cabinets of tarnished gilding. Here we lived in the midst of a congenial and sympathetic brotherhood of painters and sculptors from the neighboring studios, happy Bohemians, free to come and go as we pleased. Our system of study and practice was based upon that of the École des Beaux-Arts, and under the powerful stimulus of the master's criticisms and under the inspiration of the atmosphere which he had created for us, our work was carried on with enthusiastic loyalty. If outside of our boundaries there seemed to be little or no recognition of architecture as a fine art, within it was not only illustrated by all the wealth of the Old World, but made living to us by the almost tempestuous zeal of the master. In such a place the most unimaginative mind could not fail to be kindled. Whatever latent powers of expression in art we might have were aroused to vigorous action. In that beautiful chamber where he lived we traversed every corner of the world of art and filled our sketch-books with the fruits of enchanted travel. But amidst all this excitement and enthusiasm, Hunt ever insisted upon the preëminent importance of academical discipline and order in design. He was most concerned that the substructure of our knowledge should be serious, sane and solid. We were instructed to make our plans on rigidly scholastic lines, and the vertical developments in the elevations we were taught to study in strict Classic form according to the method of the French School. Respect for authority and discipline was thus inculcated, and we unlearned much of the romantic license which at that time tended to turn the practice of architecture into the hands of amateurs and virtuosos. But while he insisted on the preservation of the Classic formulas for the sake of the training of mind and hand, he heartily encouraged the study of every style in which the thought of man had expressed itself in beauty or power. His photographs, books and prints, his own drawings, gave us a large view over the whole historical field Academic prejudices never affected the large catholicity of his mind. His criticisms of our poor attempts were pungent and severe, but so genial and picturesque that every visit left behind it not only an enduring inspiration, but an atmosphere quickened by his energy and illuminated by his inexhaustible humor. For he was as much a comrade as a master. In short, our experience was a liberal education in the fullest sense, and when we left him with our imaginations no longer sterilized by prejudice and partisanship, but enlarged and enlightened by his influence, his warm interest in our personal and professional welfare never ceased. For myself, at least, in the years that have since gone by, the fine impulse which he first gave to my life has been revived by countless unexpected offices of kindness and solicitude. Through all the vicissitudes of time and space I have felt the warmth of his generous heart.

When, more than thirty years afterwards, in 1893, several of us were summoned to act together again with him on the great national arena at Chicago, the natural dominance of the master again asserted itself without pretension and we once more became his willing and happy pupils. To this instinct of family loyalty in art, through which all the trained intelligences then called together became close kindred, to this ideal relationship of mutual interest and affection, may be attributed in no small measure the majestic unity of the Court of Honor.

When, therefore, the Royal Institute of British Architects gave to Hunt its gold medal of 1893, it honored the man, who, more than any other, had by personal force and high training secured for the architecture of our time and country a standing adequate at last to represent our civilization in terms of art. We recognize the justice of this great distinction less because of any single achievement of his than because we feel and know that our profession has worked upon a higher plane of endeavor and has received from the public a greater respect and consideration since this man began his noble career among us. The American Institute of Architects and, indeed, the whole profession, were honored in the honor conferred upon him. For the vitalizing and enchanting personality which impressed itself upon his immediate pupils and, through them, upon his pupils' pupils in ever widening circles of beneficent influence, invigorated and enlivened also the first years of this Institute. The battle of the styles was then, as I have already intimated, waged all over the architectural field, and it must be confessed, the earliest discussions of this Institute were ensanguined by the great dispute. Hunt, with all the martial gallantry of his nature, inspired the Classic camp with ardor. The Gothic side was championed by the strongest and best equipped men in the profession. The whole historic arsenal was ransacked for weapons on both sides, and the controversy was carried on with such heat and was so engrossing that finally a vote was passed (I think it will be found in the archives) excluding this dangerous subject from the discussions of the Institute. It will be readily understood that in these animated disputes the pupils of Hunt, whose names you will see on the first lists of the Institute, where they were written thirty-seven long years ago as associates, followed the white plume of Navarre, and, inspired by him, with rash zeal dared to measure their maiden weapons with those of the oldest and most experienced warriors on the other side, men who were doing work, which, though our art has since immensely enlarged its scope and exalted its ideals, still holds a high place and has already become, if not venerable, at least historic. But when the smoke of battle cleared away, it would be found that the wounds were not deep and that good fellowship had suffered but little strain.

Indeed, in this respect, it would be difficult to exaggerate the change immediately effected by the establishment of the Institute in the personal and professional relationships of its members; and in this beneficent work Hunt's influence was preëminent. Before this establishment community of thought, mutual friendship hardly existed among architects. The hand of each was turned with jealousy and suspicion against his brother. His processes of design and his business methods were personal secrets. Each concealed his drawings from the rest as if they were pages of a private diary. Even books and prints were carefully secluded from inspection by any rival. Pupils were apprentices, and, as in my own case, often looked with eager and unsatisfied eyes through the glass of their master's locked bookcases. There were no ethics of practice, no common ground of mutual protection, no unity of action or thought, no national literature of architecture. The current professional periodicals of England and Germany furnished the sole inspiration of nearly every architectural office in the land. Our work was a dim reflection of the fashions of our British contemporaries, and, in our architecture we still remained a dependent province of the mother country. Every conspicuous note which was blown on the other side of the Atlantic had futile and barren echoes in our own land.

When the first American graduate of the French School of Fine Arts appeared upon this scene of narrow architectural subserviency,

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of professional confusion and doubt, the conditions were ripe for change.. The formation of the American Institute of Architects was not intentionally but practically a new Declaration of Independence, in which the ardor of Hunt, crowned as he was with the approval of the highest architectural authority in the Old World, played the part of the big signature of John Hancock. I trust I do not underrate whatever other conditions conduced to this most memorable emancipation, but, in my own mind, among them all, Hunt's influence was the most potent. I feel sure that the union and brotherhood of professional interests which then manifested itself for the first time on this continent, and the strength which came from that union and brotherhood — the strength with which you now, my brothers, are strong and independent, the strength which has made you Americans in art as in politics — may in no small degree be attributed to the man, who, at the most critical moment in the development of our national architecture, proved by his example that the most rigid discipline and highest culture which could be furnished by the Old World was not inconsistent with the most aggressive and uncompromising patriotism. He brought back from the School of Fine Arts in Paris, not merely a collection of venerable formulas and academic prejudices to make us still more dependent, but a spirit enlarged, enlightened, cosmopolitan. Under this vigorous and wholesome influence, his children in art and his children's children, who in prolific generation have multiplied so as to constitute, I verily believe, the representative majority of this Institute, ceased to be provincial and became national. Thus in respect and affection we are celebrating the career and services of one who, though but little older in years than some of us, has proved his right to be called one of the fathers of American architecture.

It is needless to repeat here the long and brilliant list of his works, which include some of the most interesting monuments of our time. We all know them well, and all of us more or less consciously have gathered strength and inspiration from them. But we cannot cease to regret that the noble powers, so admirably fitted for the expression of the grandiose, the magnificent in our art, should have had their principal field, not in our national monuments, which his hand would have made worthy of our civilization, and a quickening impulse in our national art, but in decorating the superb privacies of the Vanderbilts and Goelets, the Marquands and Astors, the Belmonts and the Gerrys. Concealed behind the guarded hospitalities of these generous patrons of architecture, the studied proportion, the lovely details, the monumental beauty of Hunt's interior work are doing profitable service in the cause of a higher culture and a nobler civilization. But private work cannot be recognized as expressive of national refinement and national progress. Hunt's latest years, as you all know, when he was suffering from cruel bodily distress, were largely spent in aiding the Institute in its patriotic endeavor to bring our government to a realizing sense of its responsibilities to art. To this noble effort he devoted himself with loyal energy, and much that our cause has already won in Washington is due to his personal influence and to the magnetic charm of his sincerity and zeal. Hearts, most inaccessible to the silent appeals of beauty and grace in art, were won at last to respect the cause which had for its advocate a man so irresistible in his vitality and so unique and charming in his presence.

But while, with the exception of two buildings at West Point and the National Observatory at Washington, no commissions of national importance and no official honors came to him from the government of his native land, he received from foreign countries recognition such as no other American has enjoyed.

On the 25th of November, 1882, he was made Honorary and Corresponding Member of the Académie des Beaux-Arts of the Institute of France.

On the 29th of July, 1884, he was decorated as Chevalier of the Legion of Honor, the "*demande*" being supported by such great names as Baudry, Bouguereau, Ambroise Thomas, Ch. Garnier, Ballu, Bonnat and Falguière.

On the 26th of January, 1886, he was made member of the Société Centrale des Architectes Française.

On the 1st of February, 1886, he became honorary and corresponding member of the Royal Institute of British Architects.

On the 12th of April, 1887, he received similar recognition from the Society of Engineers and Architects in Vienna.

On the 29th of June, 1892, he received the degree of LL. D. from Harvard University, the first honor of the kind ever bestowed on an architect, and one which he especially cherished as coming from his native land.

On July 13, 1892, he became an academician of the Society of St. Luke, in Rome, the oldest institution devoted to art in the world.

In 1893 he received the royal gold medal of that year from the Royal Institute of British Architects, the first American thus honored.

In the same year he received, perhaps, the most distinguished honor of all in his election to fill a vacancy as associate member of the Institute of France, Franklin, I believe, being the only other American so distinguished.

And it is a pleasure to us to remember that in electing him third President of the American Institute of Architects in 1888, we also did him honor, while he, in that capacity, added to the obligations which all architects in this country are glad to acknowledge.

It is not improbable, indeed, that Hunt's professional accomplishments were even more highly appreciated abroad than at home. But the modesty of the man was so sincere, and his heart was so simple, that all these honorable distinctions, most of which, perhaps, you now hear for the first time, were received and held by him in trust as recognitions of the progress of our national art. He did not and could not associate them with his own merits. He practised his art, not for what it would return to him, but because he loved it, and "he blushed to find it fame."

The personal attributes of Hunt gave to his professional character a captivating animation, a frank sincerity, and these qualities, combined with the dignity of his bearing and his manly beauty, made him a notable individuality wherever he moved. His artistic conscience was not a mere instrument of service to be laid aside when not in use, but an active and animating principle of his life. And so he wore it with a peculiar gallantry of manner, not before his professional comrades only, but before the world. But if his manner was sometimes extravagant and impetuous when he was charged with the enthusiasm of his heart, he more often won his audience by a touch of irresistible humor, by a gaiety and *bonhomie*, which betrayed the fundamental sweetness of his nature. He loved to talk of his art among his friends, and no one was ever so prompt as he to uphold the dignity of his profession, none so generous in protecting and publishing the good work of his brethren, none so gentle and so just in criticism. But he never spared any form of vulgar pretense which threatened to debase that high ordeal which he sought to establish for our art in America, and he hated sham. Indeed, in the social world, where, because of his accomplishments he was admired, because of his honest and manly heart he was beloved, he was the knight-errant of architecture, turning indifference into respect and doubt into honor for the supreme beauty and dignity of his mistress.

As to Hunt's professional achievements, an architect in the presence of architects cannot indulge in criticisms with the freedom and confidence of judgment which are displayed by those without professional responsibilities and convictions. We are all of us too deeply committed by practice, too deeply engrossed in the evolution of our own ideals to judge them without sympathy too warm for truth, or, perhaps, without bias too strong for justice. But the practice of architecture is now no longer a bitter conflict between opposing schools, each striving for preëminence at the expense of the rest, rather a generous emulation carried on upon lines, not parallel indeed, but all tending, as we hope, towards the establishment of a consistent style adequate for our vast and complicated civilization. I venture to say that no one here will question that our late illustrious comrades, Hunt and Richardson, were the most conspicuous leaders in this large and liberal movement. They brought from the French School all its discipline, all its wholesome respect for Classic authority and academic principles, but in practice they expressed themselves with a freedom from classical restraint and scholastic subserviency, which, as it would have been well-nigh impracticable in France, must, it would seem, be accepted as the result of new conditions of life acting upon trained but receptive minds. We can already recognize the service which these minds, so influenced, are exerting in the evolution of these new local types of architecture, which, through much tribulation and infinite errors, must slowly but surely be taking shape among us. The monuments which they left behind them have been powerful agents in preventing the dangerous liberty of our art in America from degenerating into license. Unlike Richardson, Hunt did not leave upon his own work an impression of strong personality, and for that reason his leadership, though far less evident and picturesque, is far safer against the dangers of aberration among his followers. No one can follow Hunt and go far afield. He did not pretend to be inventive, or desire to be original, and the impulsive individuality, so prompt to assert itself under all other conditions, nearly disappeared behind the historic types which he used in design. He respected them too much to use them consciously as a vehicle of his own temporary moods. Only once, when captivated by the phenomenal Graeco-Romantic movement in France under Labrouste, which promised at one time to turn the whole tide of French Renaissance into new channels, did his natural vivacity of temperament betray him. This was an interesting incident in his career, and, by its singularity, it accentuates his prevailing mood of aristocratic reserve. His pencil in hand was a magic wand, which chastened the buoyancy of his imagination and made him a scholar. Thus he founded no new school. He prevailed, not as an irrepressible genius who breaks traditions, but as a guardian who respects them with the spirit not of an antiquarian but of an artist. His admiration for the great works of the past was based, not upon emotion and sentiment alone, but upon knowledge and solid conviction. He had no ingenious theories concerning the development of modern art; his methods of thought in design were not at all speculative or inventive, as would seem to be most natural to a mind so animated, a spirit so quick and eager; rather were they exact, reserved, business-like. These underlying qualities preserved him from eccentricities or experiments in architectural expression and extended to the conduct of his affairs and the discipline of his office.

He worked with great ease and pleasure to himself in modern French Renaissance, purified and chastened by Greek influence. This, as it were, was his native tongue. In his hands this style was

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flexible to all the new conditions of material and use in the New World, but his characteristic use of it was rather serious and restrained than playful or expansive. It is in this respect, I believe, that his example is most valuable in the development of national style. But he left behind him also, in proof of the versatility and liberality of his mind, a series of conspicuous works, based upon the architectural expressions of an era when the art of the Middle Ages was adjusting itself with astonishing felicity to the exactions of the higher civilization and of the more refined domestic ideals of the sixteenth century. As Richardson found in the vigorous promise of the Romanesque of Auvergne a language of art, agreeable to the robust nature of his genius, and capable of new developments in the service of modern life, Hunt discovered the prolific germs of new life in the lovely domestic Gothic of Touraine, whose progress was checked by the revival of learning in the sixteenth century in France. In the luxurious and flamboyant delicacy of this style, in its elasticity and bright exuberance, in its poetic beauty and cheerfulness, he seemed to find a medium of architectural expression, congenial to his own indomitable youthfulness of heart and not inconsistent with the dignity and order of his cherished ideals.

Among his latest works the superb house of the Goelets and the interior of the beautiful pavilions of Belcourt at Newport, and, above all, the château of Biltmore in North Carolina, bear witness not only to his profound respect for authority and to his command of precedent, but to his pliability of mind, which enabled him to accommodate all the complicated conditions of modern living within the reasonable compass of the Gothic of Chambord or of Pierrefonds. Indeed, in these works, he carried the style a step further in natural development without any conscious attempt to express in it his own insistent individuality. No one who studies these beautiful compositions in plan or elevation, without or within, can fail to be impressed by the patient and conscientious elaboration of their delicate detail, and by the constant evidence of wise self-repression and reserved force.

When Hunt began his career in America, the English Gothic revival had full possession of the field, and architecture seemed to be in the hands rather of archæological pedants than of creative artists. There was no life in it; it was never happily adjusted to modern conditions and it came to nothing. It now only survives under the protection of the English Church. But the rehabilitations which we are now considering were in the hands of intelligences, disciplined by classical studies, yet open to all the inspirations of a new life in a new world. If they were romantic in form, they were modern, they were American, in feeling. No service of the life of to-day was inconvenienced or embarrassed for the sake of archæological conformity. Hunt's experiments in romantic style, therefore, promise, if rightly used, to serve as enlargements and enrichments of the language of American architecture; they are surely not obstacles to its natural development and will not be set down as barren events in the history of our art.

His ardent solicitude for every detail and process of artisanship which contributed to the architectural symphony brought him into close contact with contractors and skilled mechanics of every calling and grade. Between the master and the workmen there arose a warm feeling of mutual respect and consideration which is the strongest possible testimony of the unaffected simplicity and sincerity of his heart, and of his ability to teach without condescension and to correct without offence. It was in affectionate recognition of these rare and gentle qualities of the master that, in completing the W. K. Vanderbilt house in New York, that delicate casket of precious architecture, the workmen, using a wisely given liberty of design in carving the finial of the highest gable, placed there the life-sized portrait figure of the architect in the garb of a fellow-workman with mallet and chisel in hand. In this way he was elected into a companionship of honorable toil, and, when he died, the family received many touching tributes of respectful sympathy from the master workmen who had enjoyed the privilege of his friendship. Among these expressions there was one from the workmen of Biltmore, embodied in a series of resolutions so significant that I venture to repeat their words:

Whereas, The great Architect of the Universe has in His wisdom removed our fellow-laborer, Richard M. Hunt, from this earthly mansion to a building of God, a house not made with hands, eternal in the heavens; and

Whereas, His fame as an artist and his devotion to and his accomplishments in his profession are known to the world, but his generosity, sympathy, and services in behalf of the worthy laboring men of all classes are only known to those whose good fortune it was to be under his immediate supervision;

Therefore, We who have worked under him, deeming it fitting that we record our love for and appreciation of him, have

Resolved, That in his death our country has lost its greatest architect, and our skilled workmen, artists and sculptors have lost a kind, considerate and constant friend; for neither his great fame nor his wealth ever caused him to be forgetful, indifferent, or careless of the rights and feelings of his fellowmen and laborers, who were aiding in an humbler way in erecting these beautiful buildings, which only marvellous genius could have imagined and planned;

Resolved, That to him more than any other man of our time all the representative workmen of this country are indebted for the elevation of their trades and arts to the position which they now hold in the ranks of the great army of skilled workmen.

Resolved, That we tender his afflicted family our deepest sympathy and that a copy of these Resolutions be sent to his widow.

Dated at Biltmore, N. C., August 1, 1895.

B. Worth, for the Carpenters.
J. O'Neill, for the Bricklayers.
G. Bartigate, for the Stone-cutters.
S. J. McKeon, for the Plumbers.
R. J. Miller, for the Marble-cutters.
S. C. Gladwyn, for the Wood-carvers.
J. Mortimer, for the Plasterers.
J. Miller, for the Stone-carvers.
J. C. Thompson, for the Painters.
L. Bowen, for the Electricians.
E. D. Holt, for the Tile-layers.
P. F. Jones, for the Coppersmiths and Slaters.
P. McNiven, for the Stone-setters.

Committee.

George Bartigate, *Chairman.* S. C. Gladwyn, *Secretary.*

Surely such a testimonial as this is a precious and inspiring inheritance to those who bear the responsibilities of his name — no less inspiring, no less precious than the tender and loving tributes of the master of that great estate. The principal decorations of the great hall are two life-size portraits by Sargent, one of Hunt and the other of Olmsted, who on this splendid field, as elsewhere, worked in most fortunate sympathy to the glory of art in America.

In the opening of this discourse I ventured to intimate that the life which we are commemorating was full, fortunate and complete beyond the common lot of mankind. I hesitate to speak of the element most essential to this almost ideal condition of felicity and success which was furnished in Hunt's marriage in 1861 to Catherine Howland, daughter of the senior member of the old and famous firm of Howland & Aspinwall, of New York. To this alliance he was indebted for a high companionship of the soul, a solace of perfect appreciation, a constant service of sympathy, consecrating all the most productive years of his life. His children, three boys and two girls, surrounded him with respect and devotion, and grandchildren came to make new demands on his inexhaustible capacity of love. Of the two older boys, one, as you know, was associated with him in business, and the other has now begun his second year at the École in Paris. May they carry through another generation in triumph the illustrious name they bear!

In this atmosphere of peace and material prosperity, his fame increasing, his opportunities multiplying, compassed by a cloud of witnesses who admired and praised him, the love of his art possessed him with an ever-increasing passion. In his last years, when pain and serious disabilities came upon him, this indomitable love was his comfort and consolation. Even in his last and darkest days the desire of creating filled his still active mind with a fair imagery, which, we may truly believe, though here unexpressed in form, was not a vain dreaming. Even in his ashes live his wonted fires. Upon his death-bed he was seen to raise his hand and, with the fine gesture of the artist, to trace as with a pencil in the air a line of beauty, delicately but firmly fitting the act of grace to the unconscious study of his imagination. And so, a few moments later, with insensible transition, bearing with him the divine creative gift, unsullied, undiminished, immortal, he passed over into the larger life.

> And doubtless unto him is given
> A life that bears immortal fruit,
> In such great offices as suit
> The full-grown energies of Heaven.

CO-OPERATION *VERSUS* COMPETITION.[1]

MY friend, the political economist, has a theory that all the evils of competition in the industrial world are to be cured by the one panacea of coöperation.

I call you all to witness that we have evils enough from competition and especially from "competitions" in our profession; but I do not mean by the title to this paper to intimate that coöperation can ever annihilate competition between architects. No! competitions are always with us and probably always will be. We are all tired of hearing others talk on the subject and are almost tired of talking ourselves. It is this weariness that has impelled me to suggest another topic for the consideration of this Convention, and I have set up "coöperation" against competition, not to oust it entirely from the profession, but to supplant it for a while in our discussions, to make it our latest "fad," if you please. We have tested the possibilities of competition, let us give a fair trial to coöperation.

There is reason enough to exalt coöperation, from the fact that the whole idea of this Institute is based upon it. In all our transactions we are coöperating for the good of the profession, and what I would have you consider is whether we can, with advantage, extend the field of our coöperation further than we have done. By this I mean more than adding to the list of topics to be discussed by our conventions or investigated by our committees. I mean to suggest a new motive for coöperation.

Our Convention topics and Chapter discussions usually concern themselves with the regulation of professional fees, of competitions and other questions of interest to ourselves. Once in a while something new turns up, such as the idea of getting the Government work away from the Supervising Architect and dividing it up between us. When we go to a meeting we expect to get some immediate benefit therefrom, and if we fail to get that benefit, we stay away from the next meeting. In fact, we coöperate purely for our own benefit. We do not expect nor intend to help any one outside of our profession.

Of course, what makes better architects helps the community and

[1] A paper by Mr. Normand S. Patton, F. A. I. A., of Chicago, Ill., read at the Twenty-ninth Annual Convention of the American Institute of Architects, held at St. Louis, Mo., October 15-17, 1895.

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in this indirect manner we serve the public. Occasionally we venture a little farther in an altruistic direction. We believe that if we are given a chance to plan the Government buildings, that the public will be the gainer. In so far we will do the public a service by laying hold of this work, and we need not hesitate to claim that we are working for the public in this agitation.

When our Chapters help form and revise building regulations for our cities, they undoubtedly are doing a greater service to the public than to the profession of architecture directly.

You, doubtless, see the point to which I am coming. While our main object may properly be the good of our profession, should we not add to this the avowed purpose of coöperating through this Institute and its Chapters for the public good.

To express the idea differently, let us put some of the missionary spirit into our work. Why should we do this?

First: The community needs it. The public always needs leaders and these leaders must naturally be drawn from among those qualified for the position. If those who are qualified shirk the responsibility, then the public will be misled by the incompetent. It is the duty of every citizen to contribute to the public welfare according to his ability.

The wealthy owe it to the public to devote a portion of their means to the public welfare. The physicians are called upon to step beyond the taking of fees from their patients, to assume the leadership in guarding the public against the spread of disease. When we need a revision of our statutes we have a right to call upon the legal profession to bring this about, not in the interest of their own fees, but of the public good.

Has the public no need of leaders in the domain of architecture? Individually, I trust that we are all missionaries in advocating the best art that we are able to produce; but is there not some service that the public needs of us collectively? something that the individual cannot do. I believe there will be no lack of opportunities to serve the public, if we set about to look for them.

My proposition is that this Institute and its Chapters assume the leadership in all those branches of art that are embraced under the head of architecture. Let us be on the lookout to see what the public needs and then help the public to get it. This may seem too vague a task to have any meaning, but if we apply it to the local Chapters or to the architects in any one city or town, it becomes more definite. I can best illustrate my meaning by a reference to a movement now being carried on by the Illinois Chapter.

Those of you who are familiar with Chicago know that we have not much whereof to boast in the beauty of the business district. There is no public square or park in the heart of the city, and consequently no opportunity for the display of fine architecture. What was once a court-house square has been nearly obliterated by the combined county court-house and city-hall, but there is a difference between this square and those adjoining, because the building does not entirely cover the lot. About a year ago a proposition was made to the county to pull down its half of the building, and erect a structure sixteen stories high, built out to the street-line.

This proposition developed a vigorous protest from the Chapter of architects, which was taken up by the Real-estate Board and other organizations and secured the defeat of the project.

The Chapter thought it wise not to stop with a protest against a disgraceful scheme but to lead the way to the adoption of a better one. It therefore appointed a Standing Committee on Public Buildings and Grounds to suggest a proper location for the public buildings in the heart of the city and having in mind specifically the development of the Lake-front so as to give the city at once a park and a location for such buildings as a city-hall, library, museum, exposition building, armories, etc.

The Committee on Public Buildings and Grounds thought that other professions would like to join in this movement, and to this end invited to a conference the engineers, artists, real-estate dealers, builders and the Civic Federation. Out of this conference grew the Chicago Municipal Improvement League, which consists of Committees of three each appointed by the following organizations: The Illinois Chapter of the American Institute of Architects, The Western Society of Engineers, The Chicago Society of Artists, The Chicago Real-estate Board, The Chicago Builders' and Traders' Exchange, and the Civic Federation.

It is too early to speak of results accomplished by this League, but it has helped bring the Lake Park improvement before the public until the matter has been taken up by the city authorities in a manner to promise a speedy commencement of work.

The Committee of Architects has prepared a plan showing the arrangement of building sites and the general park features. This plan was submitted to the League at its August meeting, and at the following meeting was formally adopted. The Illinois Chapter has given a ready support to its Committee in this work, and on Monday evening of this week endorsed by a formal vote the work of its Committee.

On the same evening, the writer, by invitation of the President of the Chicago Real-estate Board, addressed that body on the subject of the "Opportunities of the Lake-front," showing Chicago's lack of beauty in the centre of the city as compared with foreign and other American cities and pointing the way to redeem the city by a development of the Lake-front as the location for public buildings.

At the next meeting of the Chapter the Committee expects to propose a plan by which a large number of members shall contribute to the solution of the problem of the Lake Park and its buildings. Meanwhile the public is not distracted by schemes of rival architects, for the Chapter has referred the whole matter to its Committee.

If any of you shall see, on a future visit to Chicago, a group of handsome public buildings on the Lake-front, it will be safe to give the credit to the Illinois Chapter of this Institute.

There must be opportunities in all our cities for the architects to lead the public in some work of permanent value. This is the kind of coöperation to which I would lead the Chapters of this Institute. If we are to place the architecture of our times on a high level, we must supplement the efforts of individuals by the coöperation of all the members of the profession, and this with the distinct purpose of serving the public.

In the second place, we need to take up this work for its effect on ourselves. There is often a stronger bond in altruism than in egoism, and it would be no surprise to me to see members who will not attend meetings for what they can get out of them, coming to give their share to the work for the public. It will give a higher motive to this Institute that cannot but be helpful to all our proceedings. Let us come to these Conventions, not only to get something, but to do something.

Lastly, this work will not be without its reward. A good conscience and the sense of having helped our fellow-men ought to be enough. We will have these and more, for we will have set our profession on a higher plane in the sight of the public. The name "architect" will mean something more and higher than it did.

I see by the programme that the next speaker proposes to make some suggestions for the "Elevating of the Profession before the Public." I know not what these suggestions are to be, but I venture to affirm that nothing will do more to elevate us in the public esteem than taking up such work as I have outlined.

A recent experience will illustrate the point. The Chicago Real-estate Board has been conducting suits against the Illinois Central Railroad to dispossess the railroad property filled-in on the Lake-front, and which rightfully belongs to the State of Illinois. The committee in charge of these suits jointly with the Real-estate Board's Committee of the Municipal Improvement League held a session to consider an ordinance now before the Common Council for the depression of the tracks of the Illinois Central Railroad. When I saw the prominent members of the Real-estate Board who attended that meeting, the Mayor of Chicago and the Commissioner of Public Works who came to explain their plans, I felt an increased respect for the real-estate dealers of Chicago; for I doubt whether we could get the Mayor of Chicago to attend a committee-meeting of our Chapter.

Later, when speaking to a member of the real-estate committee on this subject he remarked, "I have often thought about your society of architects, how little the public hears of you." Why should the public hear of us or care anything about us when we never say or do anything that interests the public? As long as we are busied about our own petty affairs, we never will be heard of. If the Illinois Chapter shall take up the work which I propose to lay before it at its next meeting, I guarantee that it will be heard of, and the public of Chicago will know that there is such an organization as the American Institute of Architects, and that it has a Chapter in Chicago.

This "elevating of the profession before the public," is not an empty phrase nor a useless honor. If the public value us higher, it will pay us better; and now I have touched a motive understood and appreciated by all.

Our profession is poorly paid for the responsibility laid upon it. The compensation of individuals is always affected by that of the multitude. If we raise the profession in the eyes of the people, we help every member of it to secure a proper recognition of himself individually.

Again, if we pull together for the good we can do, we will gain an appreciation of each other and develop a fraternal interest in each other that will go far to solve questions of professional ethics and ameliorate the evils of competitions when such must be.

Our daily practice is sufficiently filled with labor for ourselves. When we come together as brothers, let it be to give rather than to get. There is such eminent authority for the doctrine that "It is more blessed to give than to receive" that we run no risk in making a fair trial of its efficiency.

I have written this paper under the impression that this Institute is a working organization with certain objects to be promoted and it is my purpose to secure an enlargement of its field of operations. Article II of the Constitution reads:

"The objects of this Institute are: To unite in fellowship the architects of this continent and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession" — and I would suggest the addition of some such words as these, "and the welfare of the community in those lines in which our profession can be of special service."

During yesterday's session views were expressed (by Mr. Gilbert), which seemed to meet with general approval, setting forth an entirely different theory of the purpose of this Institute from that expressed in the Constitution. According to this theory the Institute should not exist "to unite in fellowship the architects of this continent," but only to unite a small, self-elected aristocracy. Our effort should be to decrease, rather than to increase our membership. Our efforts are to be combined, not to promote the efficiency of the profession nor even the efficiency of our own members; but

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the main purpose is the creation of a very select club, election to which shall be the highest honor for which a member of our profession can strive.

It is hardly necessary to remark that this theory is entirely antagonistic to that upon which our Constitution was based. These two purposes cannot be made to work together in the same society. It is the existence of these opposite ideas that has thrown us into such dire confusion in the matter of the relationship of the Chapters to the Institute.

If the aristocratic theory be adopted, we have no use for Chapters, all we want is the title of "Fellow of the A. I. A."

If the other theory prevails, and we need the Chapters as local working bodies, then we must revise and reverse our whole Constitution, for we have got the cart before the horse. The only working basis for Institute and Chapters is for the Chapters to rule the Institute.

Suppose there had never been any organization of our profession, how would we naturally create such an organization?

First, by the formation of local bodies, then by the union of these in State associations, and thirdly by the election of delegates by these associations to a national association.

We will never have any harmony in our workings until we adopt one or the other policy I have outlined. If it be worth while to form such a select coterie as has been advocated, then let us vote ourselves to be such at once, and proceed by all legitimate means to reduce our numbers until by the "survival of the fittest" those who remain will be truly distinguished.

Do not understand me as opposed to this movement; indeed, if I can be guaranteed a place among the survivors, you may count me in; but if this Institute shall yield its position as the representative of the whole profession, it will not be long before the Chapters organize a truly national association.

Before the formation of the Western Association of Architects, the Institute was run on the theory that it represented the *élite* of the profession. The Western Association was organized on a more democratic basis, with the result that in a few years it outnumbered the Institute and extended its State associations as far east as New York State. Had the consolidation not occurred, the next move would have been the change of name to the American Association of Architects, with the probability that it would have increased and the Institute have decreased. Thus would have been obtained the result sought for, to make the Institute very small and select. It may be that we need two associations, one for work and one for honor, in which case I will be in the first at any rate and in the second if I can get in.

If there shall be only one association, let it be for work and, coming back to my theme, let it be to work for others as well as ourselves; indeed, let it be first for the public and second for our profession.

SOCIETIES

JOHNS HOPKINS UNIVERSITY, BALTIMORE. — LECTURES ON ARCHITECTURE.

BY the liberality of J. B. Noel Wyatt, Esq., of Baltimore, the Trustees of the Johns Hopkins University are enabled to announce a course of three lectures upon the History of Architecture, to be delivered before the University during the month of November, 1895.

The first lecture will be delivered on Monday, November 4th, by Mr. Henry Van Brunt, of Kansas City, on "Classical Architecture"; the second, on Monday, November 11th, by Professor William R. Ware, of Columbia College, on "Gothic Architecture"; the third, on Monday, November 18th, by Mr. C. Howard Walker, of Boston, on "The Renaissance."

The lectures will be given in McCoy Hall on successive Monday afternoons at five o'clock.

Seats will be reserved for members of the University, who signify in advance their desire to attend the course. Cards of admission will be issued to other persons, on application, *by mail*, to the Johns Hopkins University.

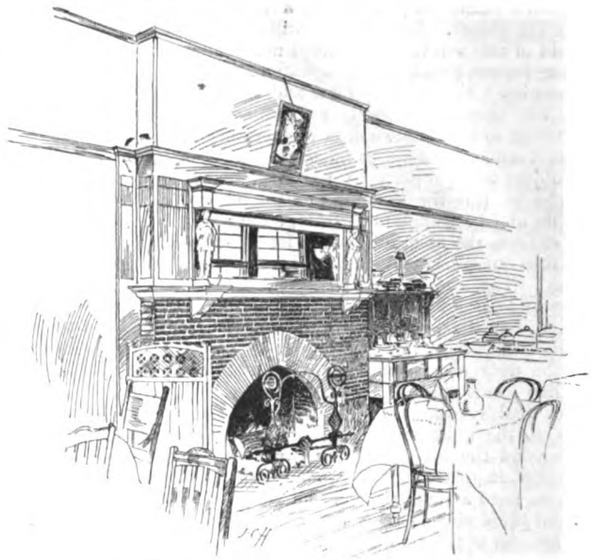
ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

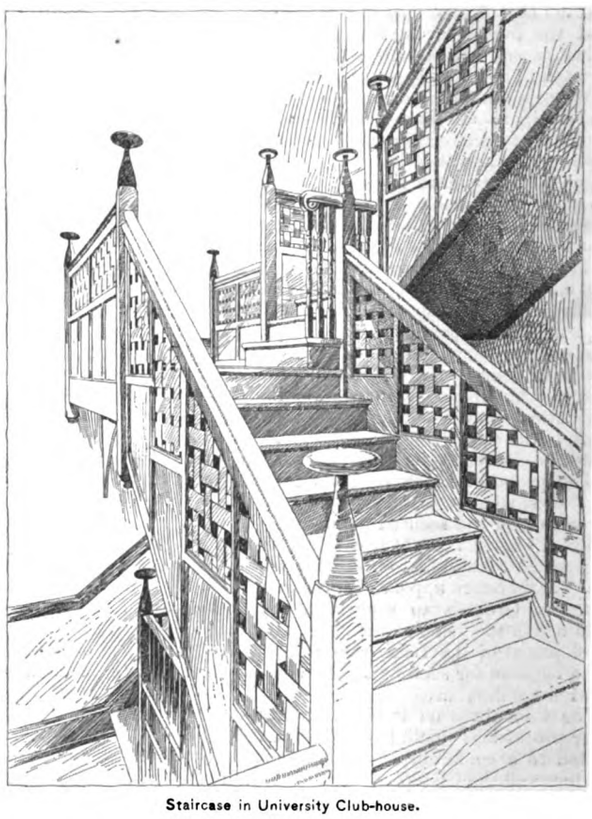
SMOKING-ROOM IN THE UNIVERSITY CLUB-HOUSE, WALNUT ST., PHILADELPHIA, PA. MR. WILSON EYRE, JR., ARCHITECT, PHILADELPHIA, PA.

[Gelatine Print issued with the International and Imperial Editions only.]

An exterior view of this building was published in the *American Architect* for December 13, 1890, No. 781, and a view of the doorway in the *American Architect* for June 20, 1891, No. 808.



Dining-room Fireplace in University Club-house.



Staircase in University Club-house.

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[Copper-plate Photogravure.]

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COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CASE UNDER THE CALIFORNIA STATUTE OF LIMITATIONS.

LOS ANGELES, CAL., October 22, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — I would be glad to have the opinion of some reader of the *American Architect* on the following legal question:

A City School Board accepts plans for school buildings and a minute of said acceptance is recorded and approved. The Board did not have the money to build, and requested the Common Council to build or to advance the money to build with. The Council did not have the money either, so the building question was left in abeyance. Now bonds have been voted and school-houses are to be built, but the improvements for which the above plans were prepared will not be included in said buildings. I have furnished my bill at 2½% for drawings and specifications, but payment has been denied. The present School Board, or at least some of them, say, as they did not incur the debt they ought not to be asked to liquidate it, while others claim the Statute of Limitations. Our State laws bar an oral contract or running account of two year's standing, and a written contract of four years.

My pleading would be, first, the Board's minutes are equal to a contract, hence the Statute of Limitations does not reach the case. Plans, etc., were accepted November, 1892. Should that pleading fail, then another which would be according to the practice of the Institute of American Architects — first payment is expected when contract is let, or when work is abandoned. I could not ask payment, since the contract has not been let, and the Board has not yet resolved to abandon the work, but I can only infer it will, since no appropriation for this particular item has been made in its estimate before voting bonds, and now contracts have been let which will absorb all available money from the bonds sold. The question is, can I recover at law on one or the other of the above pleadings, or must I consider the case barred by the Statute of Limitations?

A citation of cases decided would also be appreciated by

Yours, "EQUITY."

[WE think, with "Equity," that the entering of a minute of the acceptance of his plans on the records of the School Board would be sufficient to take his claim out of the Statute of Limitations; and that he would also have a good case under the custom of architects, by which the first payment on account of their fees is considered due when the contract is signed, unless the work is abandoned. Cases under statutes of limitations, however, depend on the wording of the statute, and it is hazardous to infer from a decision in one State what the courts might say in another. It seems to us that the most important element in the matter is to ascertain whether the original School Board was duly authorized to employ an architect, or to accept plans, which would probably be interpreted as meaning about the same thing. Boards and committees are so apt to pass votes, and take action in various ways, without authority, to the injury of people who trust them, that an inquiry into this point should be the preliminary to any further action. If the Board was not authorized in due form to incur a debt to the architect in behalf of the community, it is doubtful whether any of the individual members could be held liable. In some States, apparently, they could be so held; in others, not. We should be glad to furnish citations as requested, but the field to be covered is so large that we would suggest to "Equity" to refer to such chapters as suit his case in "*Architect, Owner and Builder Before the Law*," and, with the assistance of these, to make, if he wishes, more particular inquiries later. — EDS. AMERICAN ARCHITECT.]

THE ORIGIN OF THE POINTED ARCH.

BOSTON, MASS., October 15, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — The uncertainty of the constructive origin of the pointed arch leads one to think that if it had been known to the Assyrians or Chaldeans as being beautiful, they would have used it more in their masonry. It may be *apropos* to suggest that a timber-building people first appreciated its beauty of form as a roof-support by observing the shadows of the columns thrown on the ceilings by the light from the roof-windows of their basilican churches. In a small church, in Dorchester, whose roof is supported by columns, the shadows of them on the flat ceiling coincide with what would be the lines of groined vaults necessary to support it.

Yours truly, PATRICK A. TRACY.

[THE origin of the Gothic vaulting was hardly so simple as this. Whatever may be said of the acquaintance of the Egyptians and Assyrians with the form of the pointed arch, there can be no doubt that, as the basis of a system of construction, it was first employed by the French and German in the twelfth and thirteenth centuries; and although the French and Germans were, to a certain extent, a wood-building people, their groined vaulting was a development, not of a flat ceiling with shadows on it, but of the Roman groined vaulting, modified, in some cases, by the influence of the practice of covering long, narrow rooms with simple cradle vaulting, which had been for centuries habitual with the mediæval masons. — EDS. AMERICAN ARCHITECT.]

THE ROTCH TRAVELLING SCHOLARSHIP EXHIBITION.

BOSTON, MASS., Oct. 29, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly announce that an exhibition of the work of Mr. Walter H. Kilham, tenth holder of the Rotch Travelling Scholarship, is to be held at Doll & Richard's Gallery, Park St., November 5th to November 9th inclusive. It is hoped that all who are interested in the Scholarship will take the opportunity of seeing the excellent work which Mr. Kilham has brought back with him.

Yours very truly, C. H. BLACKALL, *Secretary.*

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Shows October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St. opened October 14.

Exhibition of Water-colors: at the St. Botolph Club, October 28 to November 16.

Exhibition of the Work of Walter H. Kilham, Tenth Holder of the Rotch Travelling Scholarship: at the Gallery of Doll & Richards, 2 Park St., November 5 to 9.

Exhibition of Work by A. M. Cobb, T. B. Meteyard and H. L. Todd: at the Cowles Art School, 145 Dartmouth St., November 1 to 9.

BRIDGEPORT, CONN. — *Exhibition of Artistic Posters:* at the Public Library, November 9 to 30.

CHICAGO, ILL. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

CINCINNATI, O. — *Fifth Annual Exhibition of the Cincinnati Art Club:* at Closson's Gallery, October 21 to November 2. At the same Gallery the Woman's Art Club will open an Exhibition on November 4.

NEW YORK, N. Y. — *Twenty-eighth Semi-annual Exhibition:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice," also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Portraits of Bismarck by Walter Petersen: at Knoedler's Galleries.

Loan Exhibition of Portraits of Women: at the National Academy of Design, October 30 to December 4.

Drawings by C. D. Gibson: at F. Keppel & Co.'s Gallery, 20 East 16th St., October 23 to November 7.

Sixth Annual Exhibition of the New York Water-color Club: at the Galleries of the American Fine-Arts Society, 215 West 57th St., November 11 to 23.

Exhibition of Competition Drawings of the Society of Beaux-Arts Architects: at same Building, November 7 to 9.

PHILADELPHIA, PA. — *Autumn Exhibition of the Philadelphia Art Club:* opens November 18.

NOTES AND CLIPPINGS

PITTSBURGH SQUATTERS IN JOBOATS. — After years of unquestioned observance of the rights of squatter sovereignty, the occupants of the river-front "joboats" have yielded to the inevitable. The amphibious structures have clung to the shores of the three rivers like great barnacles. Their owners and occupants were free from the tax-gatherer, and to live in a joboat implied an extremely light drain on the purse. It is true that there existed a fluvial tax, represented in the trouble given the joboat by the river, but that was more than offset by the advantages possessed. By taking advantage of a big river, the joboater secured a position well out of the stream, and occasionally far from its margin. There he became part of his surroundings, and in due time the boat lost many of its characteristics as such, and became a house. Trees shaded its flat roof, and vines clambered about its doors and windows. This lasted until a rise greater than the one which placed it among houses took place. Then damp trouble came. The cellar of the joboat was certain to leak like a basket after its months of remoteness from water, and the river invaded this part of the boat, and forced the occupants above to abandon their home. This trouble over, the craft settled again upon its firm supports, and gave shelter to its owner and his generally numerous family. — *Pittsburgh (Penn.) Bulletin.*

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Painting Ironwork.—Considering the immense quantity of steel work now erected, the question of the best paint, and the best method of applying the same, is one of very great importance. In this country the choice usually lies between an iron oxide or a lead paint, both having a good record Some links in the anchorage of the old Hammersmith suspension bridge were found in a perfect state of preservation when removed to the Forth Bridge, where they were employed for some of the temporary work. The pigment in this case was white lead, though ordinarily this has a bad reputation for this class of work. In America, so called asphaltum paints have also come largely into use, and in a recent communication to the American Society of Civil Engineers, Mr. E. Gerber gives the results of a careful investigation into the present state of a number of bridges which had been painted with one of the above three classes of paint. In all cases rust was found to a greater or less extent, occurring always in spots in the centre of clean metal. Most of this, however, was thin, and was as bad in new structures as in old. It was, however, found that the iron oxide paints adhered more firmly to the metal than the lead paints, only one case being found in which the latter adhered well and was tough. It is, however, suggested that much of this brittleness was due to adulteration of the oil by turpentine, benzine, or other petroleum products. There is more likelihood of such adulteration with lead paints than with iron, as they are more difficult to spread, and there is thus more temptation to dilute the oil. In some cases, bridges coated with iron oxide 11 or 12 years ago were still in good condition, without having been repainted. Only two of the bridges examined had been painted with carbon or asphaltum paints, but the condition of things in these two cases was found to be not altogether satisfactory, as in neither case was the coating tough and adherent. The metal had, however, been protected by them. Mr. Gerber considers that too little attention has, in the past, been paid to thoroughly cleaning the metal before the first coat of paint is applied. Most of the rust spots found had apparently been there from the outset, and had done no harm so long as not too far advanced. The best plan of securing clean surfaces, in Mr. Gerber's opinion, would be to coat the metal with linseed oil as it left the rolls.—*Engineering.*

The Gobert Freezing Process for Shaft Sinking.—A paper by M. A. Gobert, of Brussels, on "The Gobert Freezing Process for Shaft Sinking and Tunnelling under Rivers," was read last month at the meeting of the British Association at Ipswich by the Recorder of the section, Professor T. Hudson Beare. By this process the water-bearing strata and running sands are frozen by means of liquid ammonia poured into the freezing pipes, which are sunk vertically into the ground to be frozen. The liquid ammonia, changing into gas in the freezing pipes, produces a more intense cold than that obtained by unfreezable liquids, which are themselves rendered cold by the evaporation of ammonia. By adopting direct evaporation, the danger is avoided of rendering the ground unfreezable in the event of the escape of the unfreezable liquid; the cost of the installation is reduced by dispensing with the unfreezable liquid, and with the apparatus used for rendering it cold; and the power of the refrigerating machine is much better utilized. The process possesses the advantage of being able to freeze the bottom without freezing the upper layers. Thus, when it is necessary to deepen the lined shaft of a mine which has been flooded, the freezing pipes can be placed inside the lining, without any risk of bursting the lining by the freezing of the water which is inside it. In the case of tunnelling under a river, as the evaporation of the ammonia takes place below the water-level, hardly any of the cold is lost in the contact of the pipes with the water, whereas a great quantity would be lost in employing an unfreezable liquid.

Buffalo and the Niagara Falls Power Company.—An interesting state of affairs is developing at Buffalo, which seems to prove that too little haste may be as impolitic as too much. It will be remembered that the Buffalo municipal authorities were originally disposed to insist on several somewhat arbitrary conditions in negotiating an arrangement with the Niagara Falls Power Company for the supply of current to Buffalo. The negotiations, moreover, were conducted by the city authorities very leisurely, on the assumption that the power company could not well do without them. Presently, however, the new town of Depew, a few miles from Buffalo, made a large bid for Niagara current, and before long it became evident that the whole of the electricity that can be generated by the present Niagara Falls plant could be disposed of entirely outside of Buffalo. So that that city, in which many large real-estate and other deals have been based on the assumption that electricity from Niagara would be available for light and power purposes, is now waiting on the power company. The franchise proposed by the city has been blankly refused by the power company on the terms which the city offer. The company objects to the manner in which the city wishes it to erect its poles, string its wires and build its conduits. It objects to the proposed tax of 5 per cent upon the receipts of the company; and it objects to the limiting of the grant to twenty-five years, and also to the penalties of violation. If an agreement is arrived at, it will be on different terms.—*N. Y. Times.*

Molasses Roadways in Salt Lake City.—It is not generally known, but the Utah Sugar Company has begun a novel use for the waste product from the works at Lehi, known as by-product, or molasses. Roads are actually being constructed with the syrups, which are valueless as sugar producers, the life having been extracted. The molasses is used as a cement, the body of the road material being made up of fine gravel. This new method was first used on the road leading from the country road to the sugar factory, and the travel over this thoroughfare since the opening of the sugar season has demonstrated the value of the syrups and gravel as materials for the improving of roads. The piece of road that has been so improved is as hard as the best of macadam, and even the heaviest loaded wagons do not cut it up. The syrups are first poured over the roadway to be improved, and then a layer of gravel is sprinkled on. More syrups and gravel follow in their turns, until the road is in perfect condition. There seems to be just sufficient potash salts in the molasses to give it the necessary cementing qualities. This making of roads and walks with refuse syrups from sugar factories has also been successfully tried in California. It is not at all unlikely that at the end of the present season the company will make more improvements on the roads leading to the factory. At first the molasses showed a tendency to ooze up through the gravel, but the application of an extra coating of gravel remedied this, and made the road as smooth as a floor, and as hard as pavement. —*The Salt Lake (Utah) Herald.*

The House in Warsaw which Napoleon once occupied.—The French representative at Warsaw has just received a curious petition from a Polish peasant, who asks that his house should be rebuilt at the expense of the French Government. The ground for the request is that the building in question is really a most interesting monument of the first Napoleon, which ought to be preserved. The cottage is about five versts from the fortress of Novogeorgievsk, in Russian Poland, and it is asserted that, in 1806, the Emperor passed an entire day and night within its walls, while supervising the passage of the Narev by his army. Napoleon, in fact, made the house his headquarters. At that time it was owned by a Polish peasant, named Afek, of whom the present occupant—known by the villagers as "Afek-Napoleon"—claims to be the great-grandson. Above the entrance the following inscription has been cut: "*Palais de l'Empereur*, 23 *Decembre*, 1806." Inside, on a block of black marble, is another inscription in Latin: "*Napoleo M. Imperator Rex Hostes persequens. Hic hostem exit* 23 *Xbris*, 1806 *in Okunin.*" The origin of these inscriptions does not appear to be known, but the tradition of the Emperor's stay has always been piously preserved in the Polish peasant's family.—*Boston Herald.*

The Owner not liable for Accidents to Firemen.—How far the owner of a building is liable for injuries to firemen who fall into an elevator-well when entering the building to extinguish a fire has been settled by two decisions from two courts in different States. In one—a recent case—that of Beehler *vs.* Daniels, Rhode Island, 27 D. R. A. 512, the liability of the owner is denied, the ground of the denial being that, as the owner did not invite the firemen to enter the burning building, the latter, doing so under a license conferred by law, are in consequence mere licensees. A decision of like tenor was given in the case of Woodruff *vs.* Cowen, 22 L. R. A. 198—an Indiana decision. We do not know of any other decisions that bear upon the duties and liabilities of the owners of buildings to guard against the possibility of firemen and others charged with the duty of extinguishing fires or protecting property in a burning factory, store, or house, but we may safely infer that these decisions will serve as a precedent in any other cases that may occur. At the same time it would seem as if the least the owners or occupants of buildings in which such traps exist could do would be to see that, in the event of a fire breaking out on their premises—which may occur at any moment, the firemen be not exposed through the occupant's thoughtlessness to any more risks than those with which he is always likely to meet in the performance of his dangerous duties.—*Fire and Water.*

The Legend of St. Ursula and Her Virgins.—This number of eleven thousand is an evident exaggeration. We can with difficulty understand how a tyrant, no matter how cruel, would dare to commit such a massacre, even supposing that the city where Ursula lived contained such a number of maidens. It is simply stated in the martyrology that St. Ursula was put to death with her companions, no number being given. How has this legend established itself? How have the "some companions" become eleven thousand? Opinions differ regarding this singular tradition. According to the most widely spread idea, the companions of Ursula numbered eleven. Their massacre was commemorated in an inscription running thus:

VRSVLA ET XI MM VV
Ursula et undecim martyres virgines,

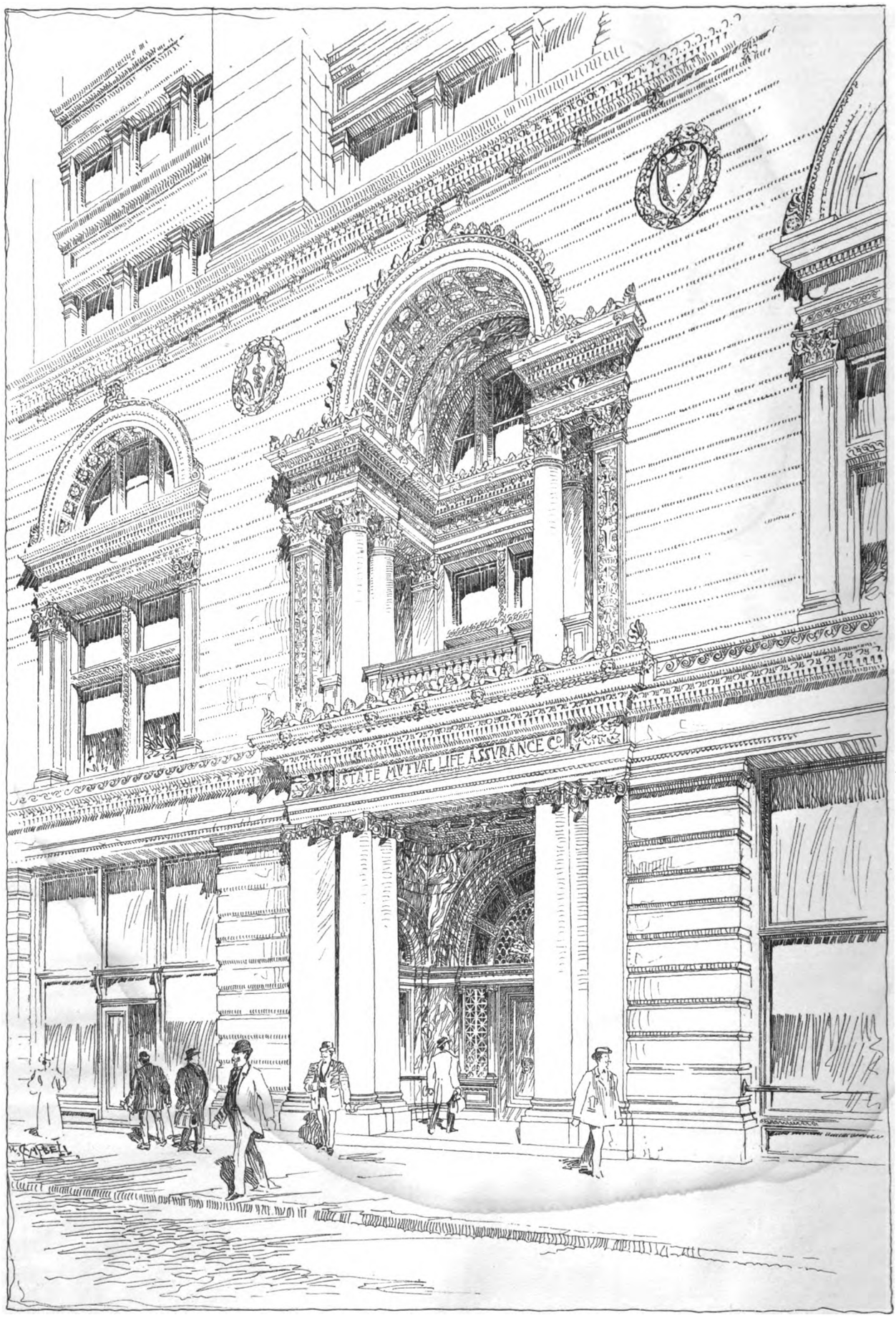
which signifies "Ursula and eleven virgin martyrs." An ignoran translator read *millia* instead of *martyres*, and so multiplied by one thousand the number of victims. This explanation is very simple and appears quite probable. Nothing prevents the characters "MM" from meaning *millia* (thousands) instead of *martyres* (martyrs) Nevertheless a doubt occurs to us. Does the inscription just quoted actually exist? Where is it? From what epoch does it date? No one tells us? So we are disposed to consider it as apocryphal, and as created solely for the purpose of assigning a cause. It is then elsewhere than in this hypothetical inscription that we seek the tradition of "the eleven thousand virgins." It was once the custom—or, at least, it was a frequent usage—when the family was numerous, to give to the children a name that should denote the order of their birth. The first was thus called *Primus*, the second *Secundus*, and so on. Two of these prenomens have survived. To this day the names of Septimus and Octavius are not rare. Now Septimus means "seventh" and Octavius "eighth." The eleventh child would then take the name *Undecimus*, and if it was a girl, the form would be *Undecima*. If families of eleven children were sufficiently frequent in that age, when the depopulation of France was an unheard-of subject, the eleventh child might be regarded as the pet of the house—the "baby." *Undecima* then would become *Undecimilla*, a diminutive form to the name more of grace. St. Ursula might have had for a companion a young girl of this name. Now, in place of *Ursula et Undecimilla*, it would have been easy to read *Ursula et Undecimillia* (eleven thousand), whence the legend of eleven thousand virgins could have arisen. As letters were never doubled in writing, the error is easily explained; it becomes altogether probable, if the story of the martyr Ursula was handed down by tradition. It would suffice that the narrator, or even the writer, was ignorant of this name of Undecimilla, which was, perhaps, very rare, and so transformed it into *undecimillia.*—*Magasin Pittoresque.*

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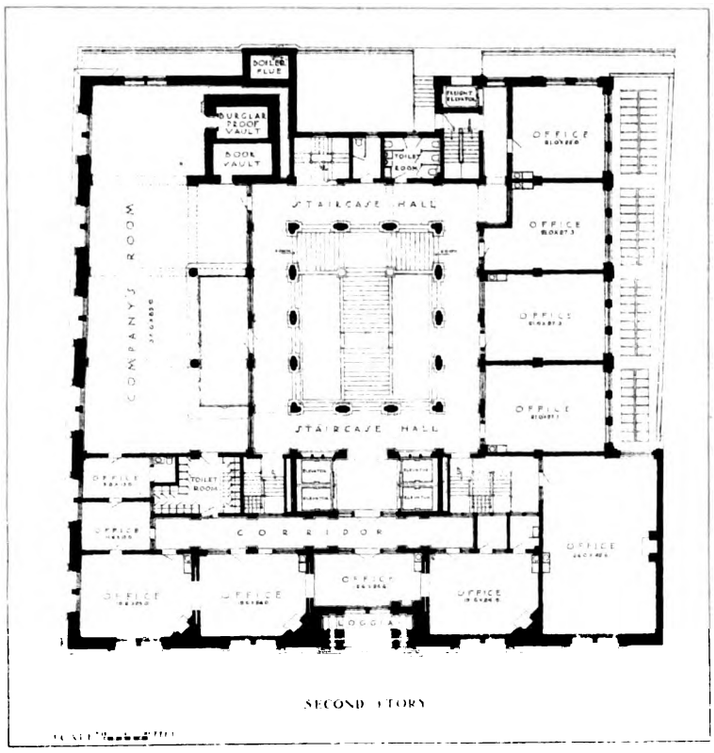
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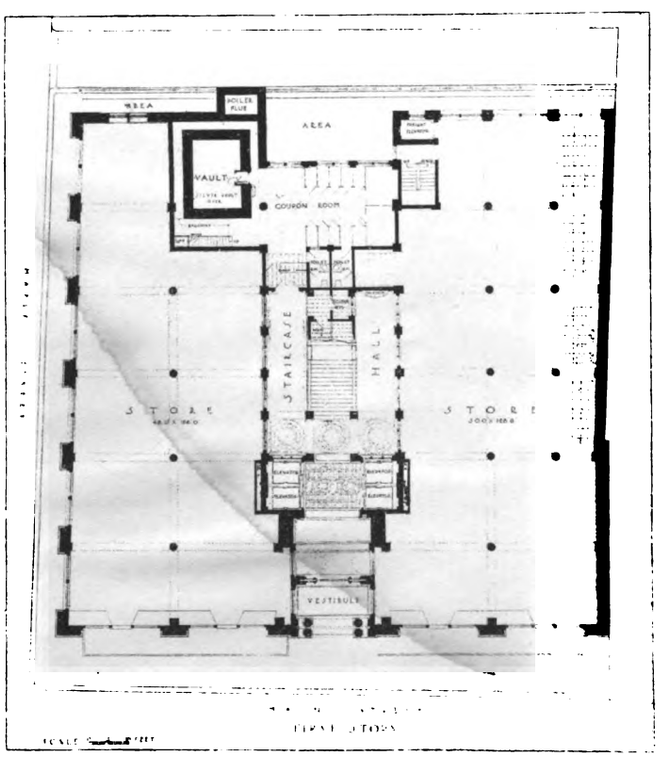
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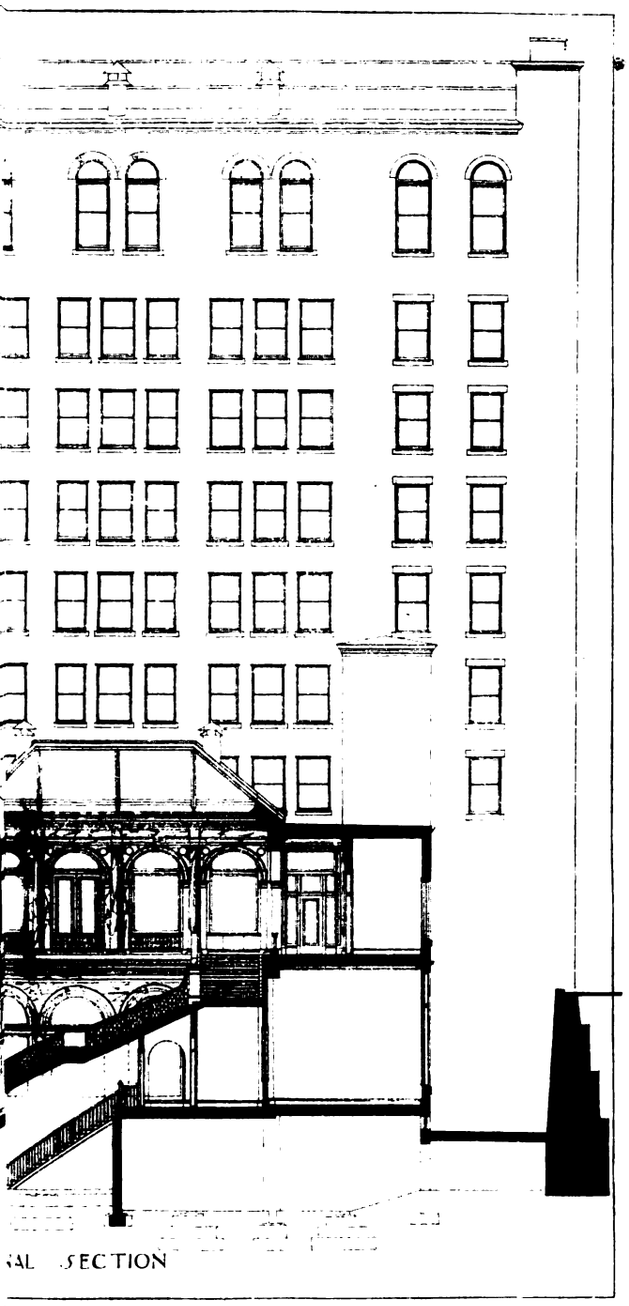




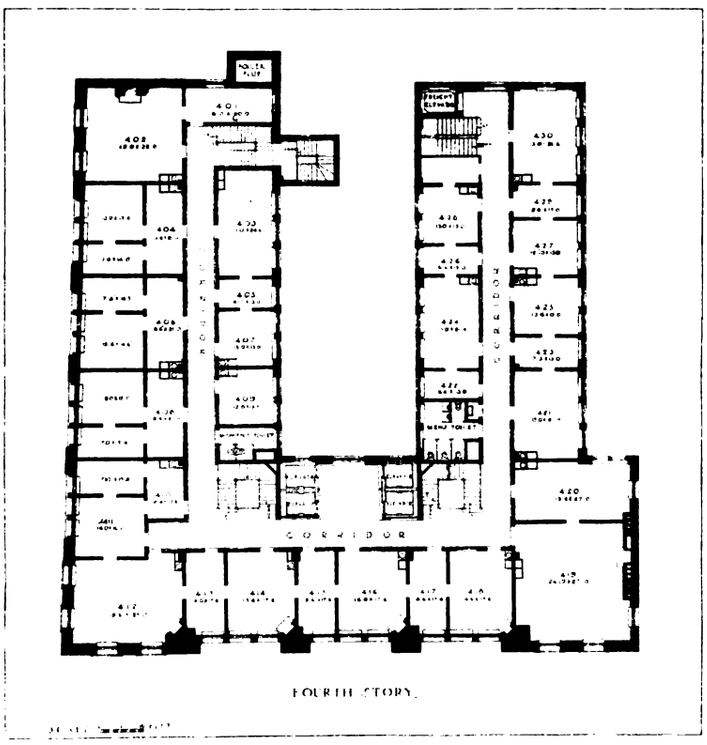
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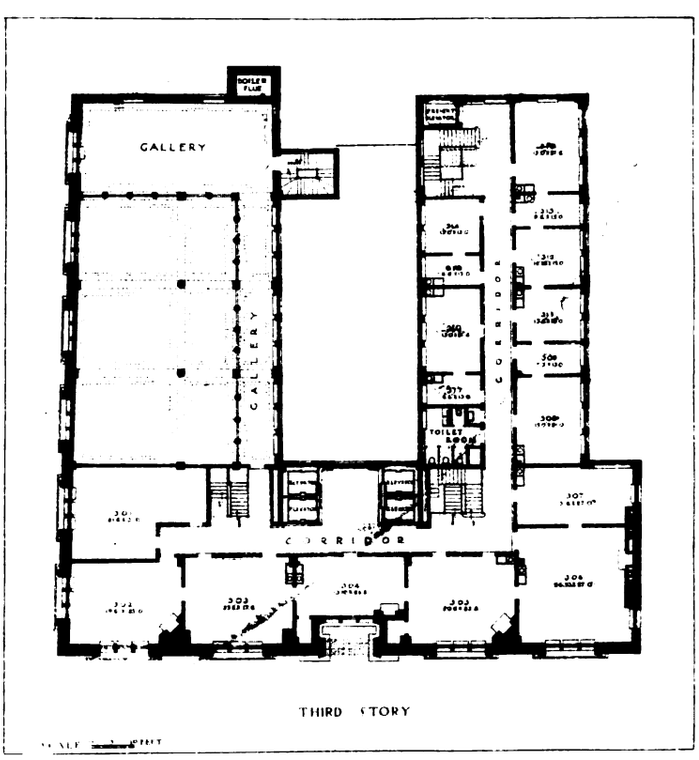
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NOVEMBER 9, 1895.

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OUR readers have probably noticed, in the reports of the St. Louis Convention of the American Institute of Architects, the official statement of the unsatisfactory condition of affairs at present existing in regard to the admission of the profession to the public building work. Briefly, although the Secretary of the Treasury is now authorized to employ private architects, and to select them by competition, there is no appropriation available for paying them, and, if there were, he is expressly forbidden by statute to spend money on public buildings except in accordance with plans and specifications made by the Supervising Architect of the Treasury Department; so that an architect employed under the Tarsney law would, for the present, have to do his work for nothing. He would, it is true, have the privilege of spending the rest of his days, if he wished, in haunting the lobbies of the Capitol, in the endeavor to induce Congress to make a special statute and appropriation for his relief; but no architect who has seen the broken-down old mendicants hanging about the halls of Congress in the vain hope of having their just claims considered will wish to add himself to the brotherhood. Nevertheless, the *Evening Post* advises the profession not to refuse to work for the Government, but to accept public employment with the understanding that they will get nothing but "glory" in return. Unfortunately, an architect's business is not like that of a lawyer, or painter, or sculptor, or scientific man. His work must be carried on with the help of subordinates, whom he must pay. In the case of an important public building, he needs a considerable number of assistants, of a class which commands good salaries; and, by the time that he has settled their bills, there is not much left for him, even if he has received his own commission punctually; so that the furnishing of his services for glory alone would mean a very large outlay of money on his part, in addition to the gift of his own time and skill. We hope that there are not many architects who would dream of committing such folly as this, and it is certain that nothing could be more injurious to the profession. The public, which takes nearly a man's own estimate of the value of his services, seeing men reputed to possess professional skill plunging into such insane folly would immediately make up its mind that architects were either conscious of having no real claim to payment for their pretended services, or that they had some surreptitious means of reimbursing themselves for their ostensible generosity; and it would be difficult to say which supposition would most discredit the profession.

IN regard to the "glory" that an architect would get by working gratuitously for the public and, in addition, paying his travelling expenses, office rent and draughtsmen's salaries out of his own pocket, an instructive indication may be derived from the descriptions of the Congressional Library which are now circulating through the newspapers. According to the head-lines of these articles, the new structure is already, although it is not to be finished for more than two years, "an astonishing revelation of the capabilities of American art," and "is likely to produce a profound sensation, far and wide, and induce pilgrimages to Washington for the express purpose of seeing it." There are buildings in Washington which "produce a profound sensation" upon the beholder on account of the "astonishing revelation" that they furnish of the capabilities of American artists, or rather, of the people whom the Government accepts as artists, for displaying, at the public expense and on a vast scale, the most dreadful ignorance of the first principles of architectural art; so the panegyrist of the Congressional Library goes on to explain that the reason why pilgrims will come to Washington to worship at the new shrine is that the building "will be, by long odds, the most beautiful, as well as the largest and noblest library structure in the whole world, and the most superb public building on this continent." After being told that "this preëminent distinction" is due to the building "on account of its extraordinary beauty of architecture," the average man, who had supposed that fine art was generally produced by artists, is likely to feel a little surprise at the information that this astonishing work was produced by a brigadier-general of engineers, assisted by a colonel in the same corps. Of course, every one, including the author of the article, knows that the original plans were made by architects, one of whom, on account of a misunderstanding with an influential contractor for the work as to the propriety of permitting the latter to use a different brand of cement from that specified, was unceremoniously "railroaded" out of the way, and the commission turned over to army officers; but, in order to remove any suspicion that the original architects deserve the slightest credit for this artistic phenomenon, we are told that "General Casey has found wide scope and splendid opportunity for his skill as an engineer, and for his broad catholicity of taste." "First, he made important modifications in the plans, to conform the building more closely to library purposes, and to its style of architecture; and contracted for all the granite from one quarry, to secure uniformity." We commend the last bold stroke of genius to the particular attention of our professional readers, who will, no doubt, bow down in awe before so noble an inspiration. As to the other proceeding, of cutting down Mr. Smithmeyer's plans, every one knows that it was taken to bring the building within the limit of cost, which, after Mr. Smithmeyer's plans had been adopted, and partly carried out, was fixed by Congress for the express purpose of getting Mr. Smithmeyer out of the way; and, as the profession is not unfamiliar with politicians' tricks of this sort, it is not likely to view this part of the story with so much enthusiasm as the rest. It is, however, an essential part of the lesson which those architects who are inclined to serve the public of the United States for "glory" only should take to heart. There is no doubt that the general arrangement, the vestibule and rotunda, which form "the greatest architectural and artistic triumphs of the interior," the "grand double staircase," the "stately pavilions" at the corners, and the "burnished dome," which combine to "form an enduring dream of beauty," were designed substantially as they have been carried out, by Mr. Smithmeyer and his partner, Mr. Pelz, the latter of whom, after the elimination of his senior, was employed on weekly wages by the brigadier artist, and actually designed the building as erected; yet the description of the building does not contain the slightest mention of either, from beginning to end. This is the sort of "glory" to be obtained by working for the Government of the United States. We do not doubt that General Casey, who is a man of the most honorable feeling, will see that, in the official accounts, the real authors of the design get the credit due to them; but every victim of the political schemers of Washington will not fall into such good hands, and architects, who are asked to work for nothing for a Government which spends three million dollars a day in paying for things which it cannot persuade their hard-hearted owners to part with gratuitously, will do well to take warning by this interesting little story.

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A CORRESPONDENT of the *Engineering Record* has been communicating to that journal some strange notions about concrete for foundations. In his opinion, the ordinary practice of mixing the cement and sand dry, then wetting this, mixing with the washed broken stone, putting into place, and tamping until a film of water appears on the surface, is all wrong. His objections to this procedure is, as he says, that the concrete is thus made too wet, and that the tamping, by bringing the water to the top, brings up with it the cement, "and thus diminishes the concretion of binding properties so necessary to its strength." His advice is, therefore, to mix the sand and cement dry, and, without wetting them, to add to them the broken stone, previously washed, but allowed to drain, and then put the mass in place without tamping.

IT is difficult to believe that a person who could give such advice can ever have seen concrete-work done on an extensive scale. Every engineer and architect will agree with him as to the impropriety of "deluging" concrete with water; but his ideas of what constitutes "deluging" are most extraordinary. By actual measurement of the water used in making some thousands of yards of concrete, with one part Dyckerhoff cement to four parts clean and rather coarse sand, and six parts of broken granite of the ordinary size, it was found that, after mixing the sand and cement dry, sprinkling them with a watering-pot with twelve gallons of water to each cask of cement, turning meanwhile, and adding the six parts of broken stone, thoroughly washed with the hose, and allowed to drain, but not to dry, the resulting mixture, when well turned, was just about as wet as garden loam, in that desirable condition for agriculture in which it will not stick to the spade. This concrete, when put immediately into the trenches, in layers twelve inches thick, required half an hour of hard tamping before a film of water could be brought to the surface, and was reduced about one-sixth in volume by this tamping. The film of water brought up by the tamping was a mere appearance of wetness, which was insisted upon simply as evidence that the concrete had been compacted by the tamping to the desired extent; and it was reabsorbed in an hour or so, carrying back whatever cement it might have originally brought up with it, so that there was certainly no loss of binding property incident to the process. This particular concrete, which was to be used for underpinning a heavy building, was purposely mixed very dry, so as to allow of the utmost possible compression by tamping. For ordinary purposes, in our opinion more water might be used without disadvantage, but it is difficult to conceive of circumstances under which concrete footings could be properly made with less water. It is hardly necessary to say that the slight film of water which adheres to the surfaces of broken granite after washing would be ridiculously inadequate for moistening the quantity of dry sand and cement necessary to fill the voids in the mass; and that concrete made in the manner proposed by the *Engineering Record's* correspondent would be a mere incoherent heap of loose cement and sand, containing lumps of a very imperfect matrix, each with a bit of granite for a nucleus.

THE German laws of 1881, making compulsory the insurance of workmen against death, sickness, old age and accident, have had some curious results, according to a paper communicated to the French Academy of Moral and Political Science by M. Arthur Raffalovich. In principle, M. Raffalovich, like most other intelligent persons, condemns the compulsory insurance laws, which, as he says, were simply political bait, intended to draw away the working people from revolutionary socialism by out-bidding what socialism had to offer. As a political device, the laws failed entirely, and socialism and socialistic agitation flourished as luxuriantly as ever until, a year or so ago, it occurred to the Government to let them alone; whereupon the socialist party immediately began to break up through internal quarrels; while, as an economical measure, the laws have been anything but successful. Although the indemnities and pensions secured by the insurance policies are very small, the premiums, half of which, in many cases, must be paid by the employer, amount, in the aggregate, to millions annually. Of course, this expense, in the case of manufactures, must be added to the wages account, as a part of the cost of the goods manufactured, and the item is quite large enough to be of serious moment in the competition which the German manufacturers are obliged to encounter, even in their own markets, with goods made in countries where such laws do not exist. No doubt, in order to sell his goods at all, the German manufacturer has to be satisfied with less profit than his foreign competitor, and this, to modern socialism, may appear an advantage; but where the less careful and thrifty manufacturers are compelled to sell at a loss, and finally to give up business and discharge their workmen, as must sometimes occur, it would be an interesting problem to ascertain whether the balance of advantages, leaving the employer out of the question, was on the workmen's side.

FROM another point, the value of the laws is even more doubtful. It was supposed, when they were devised, that the insurance companies would do so much toward pensioning the old, taking care of the sick, and making good to widows and orphans the loss of husbands and fathers, that the burden of public charity would be materially lightened; but fifteen years' experience has shown that these statutes have had no such effect, and that notwithstanding the millions taken by law from the manufacturers to pay insurance premiums, the percentage of applicants for relief in the great industrial cities, and the cost of supplying their wants, not only does not diminish, but has in many cases materially increased, since 1881, and is still increasing. In order to find an explanation of this phenomenon, inquiries were made of a large number of municipal officials having in charge the relief of the poor, and from their answers it appears that, although the insurance under the law provides assistance for a considerable number of the people who also receive public charity, it provides so little that it is necessary to ask for more. For instance, an average old-age pension is thirty-five or forty dollars a year. This will keep an old man from starving to death in Germany, but will not procure for him any comforts; and public charity is willing to add something to it. In the same way, the insurance payments for sickness are less than public charitable authorities generally think necessary; and those who receive them ask for, and obtain, additional assistance from their town or parish officers. It will be said that, even then, the money received from the insurance companies ought to save an equal amount to the municipalities, but this is not really the case, for the reason, as the officials say, that the "standard of life" has risen among the poor since the establishment of compulsory insurance. Formerly, when a workman paid his own expenses, he was rarely sick, and still more rarely sent for a doctor to attend him; but now, as they say, a workman who has his sick-insurance premiums paid for him calls in the doctor, whom he does not have to pay, at every little qualm, and puts himself on the sick-list, by way of vacation, whenever he feels himself a little out of sorts, and often when he is in perfect health, for the number of cases of pure shamming, in order to make a claim on the insurance fund for sickness, is said to be large. Moreover, as such habits are hard to get rid of, the same man, when he is out of work, and thus has no employer compelled to pay premiums for him, sends for the doctor, as before, on the smallest occasion, and, being himself unable to pay, has the bill presented to the local charitable authorities. In such ways as this, although public charity is now, owing to the vast sums paid out by the insurance companies, bestowed, as a rule, on a smaller proportion of the population of the cities than it was in 1880, the amount of municipal charity, per head of population, is materially greater, and, in proportion to the number assisted, has increased very largely. In Berlin, for example, the annual charitable expenditure per head of population, divided in proportion to the figure showing the percentage of the population assisted, was, in 1880, 4.80 marks; in 1890 it was 6.56 marks. Dantzig gives, for 1880, 3.86 marks, and for 1893, 5.03 marks, and, in general, the large cities show about the same increase. In none is there a decrease, and in some, as in Breslau, which gives for 1880, 3.49 marks, and for 1893, 18.15 marks, the increase, owing, undoubtedly, to special local circumstances, is very large.

THE competition for the Minnesota State Capitol has been decided in favor of Mr. Cass Gilbert, of St. Paul; Mr. George R. Mann, of St. Louis being placed second; Messrs. E. P. Bassford, of St. Paul, and Traphagen & Fitzpatrick, of Duluth, third; Mr. Clarence H. Johnston, of St. Paul, fourth, and Mr. Harry W. Jones, of Minneapolis, fifth. Mr. E. M. Wheelwright, of Boston, was the expert adviser of the Commission, and his recommendations seem to have been, in the main, followed.

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ART IN THE MODERN CHURCH.[1] — V.

THE DANGERS OF THE PICTURESQUE.



Fig. 15.

THE predominant note in current American church architecture is the picturesque. It is a quality that is more and more coming to dominate our architecture as a whole, and which has long since been the distinguishing characteristic of the American country house. Few architectural qualities are so delightful as this, and its development is a fact that all lovers of the art must regard with the utmost satisfaction. Yet as the leading quality in our church architecture it is to be most heartily condemned. Picturesqueness does not give a Christian character to a church any more than it endows a dwelling with an odor of holiness. A Puritan would, perhaps, argue that it was essentially carnal, since it distracted our thoughts by mere beauty of form, and was physical rather than intellectual. In reality we run into greater danger. The picturesque now so completely absorbs the attention of our architects, that every other quality is let go. Obtain a picturesque design where the site permits it, the architect exclaims, and you need not worry about the success of your design!

The picturesque is not a quality to be despised in any building, religious or secular. It is delightful and fascinating, and produces that sensation with which the eye is most readily charmed. But it is not all of architecture, nor should we fasten all our architectural faith to it. That is the error of its use in the church. If a country church, for example, has a picturesque air, if it sets well with the surroundings and is admirably suited to the landscape, it is generally supposed that the very greatest success in church design has been obtained. Yet the picturesque is the most secular of qualities. If it were sacred, how could it appear to the overwhelming advantage it exhibits in the dwelling, to name but a single secular instance? If it were holy by nature, should we not insist on it throughout our



Fig. 16.

worship? Should we not deem that church the "truest" which supports the most picturesque service? Should not our ministers and priests be chosen for their picturesque appearance or their picturesque sermons? The absurdity of the thing is so apparent that it requires no demonstration; but it is not useless to place it in a logically absurd light in order to show the folly of remaining satisfied with it, and with it alone, as the one great quality of our church buildings.

The danger of the picturesque in our current architecture is that, having obtained it, we will remain content with that single quality,



Fig. 17.

without insisting that the religious element shall be the chief characteristic of our churches. The two elements are not in the least oppositive, and each, as a matter of fact, helps the other; but if it is necessary that one be chosen and the other left, if it be necessary, even, that they be separated and one rejected and the other accepted, there can be no doubt, in the mind of the Christian builder, which he should choose.

Every traveller in Europe knows how admirably the picturesque and the religious qualities were combined in the mediæval churches; combined, indeed, until the one cannot be separated from the other, and the harmony of the design results from the harmony of the combination. Of the multitude of examples that might be chosen I will name but one, the Cathedral of Autun. This charming church is delightfully situated on one side of a city that is backed by a succession of green hills. Not large enough for mountains, this background affords the best possible setting for the roofs and towers of the cathedral. Seen from across the city the view is charmingly picturesque, yet one never, for a moment, questions the inherent Christianity of the architecture.

The point is, not that the architect of the church should avoid the picturesque, but that he should not aim at it exclusively. At present we might broadly say that the aim of our architects was to produce picturesque churches. Yet there is nothing religious in this, and unless the religious character be maintained in the design it does not represent a religious structure at all. Hence it is that the use of the picturesque, the fondness for it, its popularity, even its own

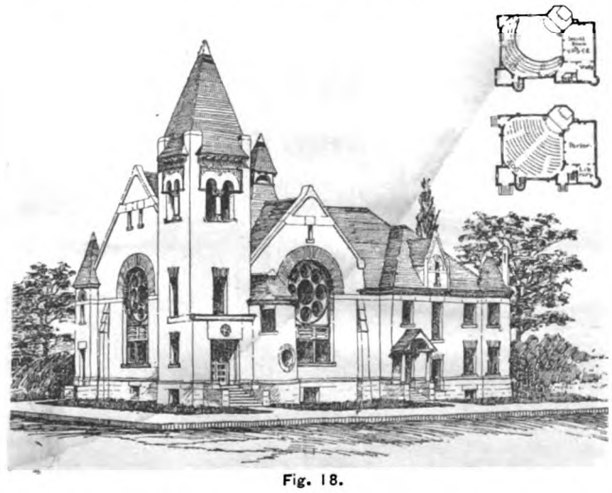


Fig. 18.

inherent merits, are sources of positive danger to the modern architect.

It is not necessary to attempt a classification of the various sorts, kinds, styles, fashions and modes of the picturesque that appear in current church architecture. But a survey of recent buildings, if conducted on a broad scale, will show many churches of a varied type in which the architect has evidently been trying to obtain a

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1035, page 45.

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picturesque effect, yet only got unpleasant results. The study of such designs is not a pleasure, for it testifies at once to the failure of the architect to rightly comprehend his problem, on the one hand,



Fig. 19.

and on the other, to the inability of those choosing the design to properly estimate its merit. Some idea of what is meant by this kind of unfortunate picturesqueness, may be gathered from Figure 15,

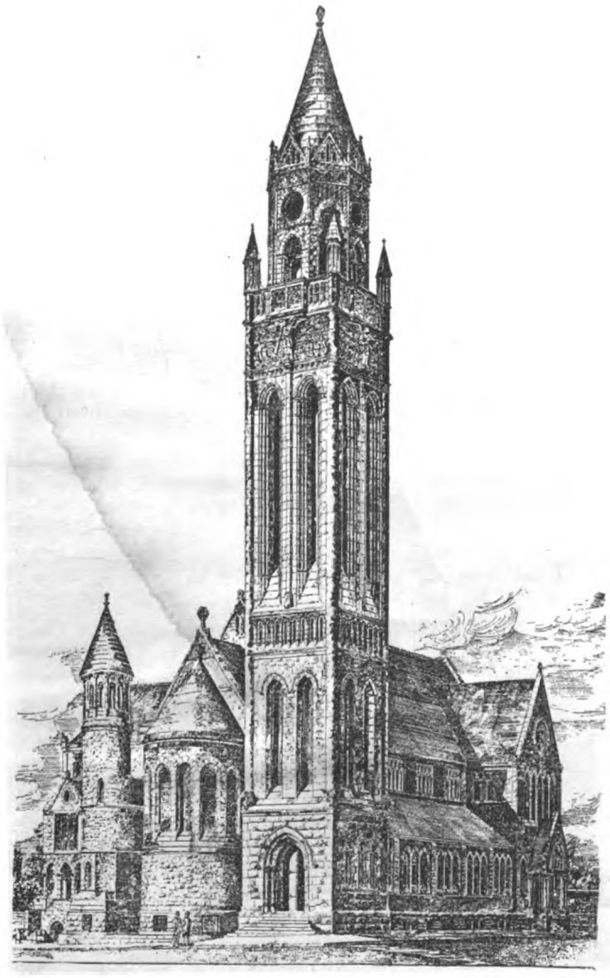


Fig. 20.

which is a design for a church, chapel, parochial residence and school. Of the main portion it may be said that the author has depended on the mere use of forms and the shape of his building to make it look like a church. And if nothing more than this were needed in a church design — though a process to be most heartily condemned — it would not have been ineffective had it not been burdened with a tower on the corner, doubtless intended as picturesque, but really depriving the building of dignity. This tower absorbs the attention to the exclusion of everything else. It is not an easy, sober, stately tower, but it is covered with pinnacles, and is crowned by an octagon with an open gallery and a cone, which has two series of dormers. And below, for no manner of purpose so far as the drawing shows, another tower has been tacked onto the corner,

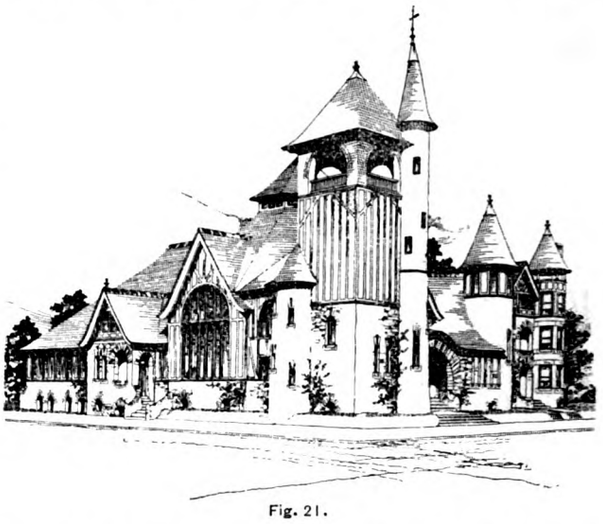


Fig. 21.

beginning above the ground, and stopping below the crown, as though, having discovered it was rootless, and therefore without strength or utility, it came to an untimely end in a parapet that certainly shelters neither cannon nor men-at-arms.

Figure 16 is a most extraordinary design. It does not seem possible that a more varied or more variegated design exists in the world. It is remarkable not only for its variety, but because its authors aimed at no other end. Given a lot of tolerable size, and the relatively simple problem of erecting a church and Sunday-school building upon it, with minor offices, and having the further advantage of building the church on the main floor, the other portions occupying the adjoining land, they set to work to cut up their design into almost as many pieces as they could, then joined these various parts together, and put it into permanent form.

It is difficult to decide at what point to begin to study this design, so many are its parts, and so frequent and diffuse its points of departure. The octagon, which rises from the truncated end, is over the main entrance, the greater tower serving to divide the two main divisions of the whole. There is a very great deal of material in this latter tower. On each corner is a small diagonally-placed buttress. The one on the right is stopped below the other, and is surmounted by a column, which, presently spreading out, carries an octagonal turret, that, in due time, becomes circular, and then a cone, at which point further variety in shape being out of the question, it comes to an end in what seems to be a lightning-rod. The variety in this piece is the key-note to the whole design. Everywhere there is change, ceaseless and unending. The gable next the tower, which has a rectangular base, apparently added as an afterthought because the mammoth window below it was too large, is

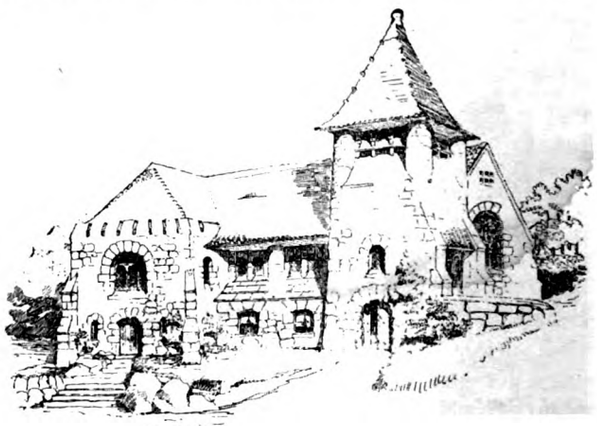


Fig. 22.

enclosed within turrets of different designs. The result, as a whole, is a collection of parts. No one portion is continued for a sufficient space to acquire dignity; the roofing line is cut up into as many

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parts as possible; and this unrest and variety, this imaginary picturesqueness in change of shape, seems to have been the underlying idea of its creators.

This may be proper enough in some structures — we need not open the question — but that it is entirely unsuited to a church this example must make clear. The standpoint of the designers was totally wrong. A collection of parts, which are parts, and nothing more, will not make a churchly looking edifice, even when greater care is exercised in making the collection than in this instance. There are other errors and misfortunes in this design, but for our present purposes we need only look at it as a peculiarly unhappy effort to design a church on a radically wrong basis.



Fig. 23.

Figure 17 is another example that may be classed with the foregoing. Here is a cutting-up of wall-space, a varying of roofs, with an extinguisher-sort of a tower on the corner that does its best to seem out of place. There is absolutely no rest here, and one almost looks to see the umbrella with which the tower is capped, spread open and take the upper part off to the skies. It is a striking instance of the misconception of the true nature of church design that is so frequently seen in this country. In attempting to obtain a picturesque effect through the employment of a great variety of parts the architect has wholly overlooked the possibility of a truly religious building. There is nothing here to give Christian character, though we know it to be a church, because it can be nothing else, and because, alas! we have seen many other buildings we know to be churches, of a similar style and form.

As an example of a relatively simple edifice illustrating the same principle, Figure 18 may be studied. The portion to the right is devoted to social uses, and this strongly resembles a dwelling, though, being an integral part of the church building, so close a resemblance is not to be commended, especially as it is not used as a residence. For the rest, there was sufficient opportunity for simplicity, but it has been discarded for towers and turrets, which, while not important enough in themselves to justify their expense, have the unfortunate effect of destroying all harmony. The problem here was relatively simple, and apparently only a limited amount of money was to be expended; yet even in its simple and plain forms enough distraction has been introduced to produce a result far from satisfactory.

And so with the church shown in Figure 19. It is a more pretentious design than the one which immediately precedes it, but not one of these expensive towers, on which so much dependence has been



Fig. 24.

placed, gives to the structure that Christian character which would lift it above secular edifices as peculiarly sacred. The architect sought to make a varied outline, to introduce some new and original features, and to depart, as far as he could, from the beaten track, yet all his effort has been wasted. A search after the picturesque was the snare that led him astray from the lines of religious architecture, and his work, like the other examples we have seen, shows how dangerous the picturesque may be in the hands of the church designer.

The drawing of a church in Figure 20 represents a more pretentious edifice than any of the foregoing examples. The placing of an apse upon the main front has, of course, given occasion for a feature



Fig. 25.

in that situation that does not ordinarily form part of the main façade. But this provides no excuse for the many little parts that form the front to the left of the apse, introducing almost as much variety as could well be put into this space, quite destroying the harmonious treatment that might have resulted had the broad space here been treated in a quiet and orderly manner. It was a mistaken notion of the value and function of the picturesque in church design which spoiled this work, and it will spoil every church in which it is made the dominating feature.

A concluding example of the phase of the picturesque we are examining at present may be seen in Figure 21. Here, in a single front, we have practically five towers, beginning with a chimney at the extreme right. For a single church, and a semi-suburban church, this is doing pretty well. But the tale is not all told; around the corner of the main tower is a smaller applied circular tower, that raises the total number on the two façades to six. When one recalls that the Cathedral of Chartres has eight towers, though only two of them are completed, and that the Cathedral of Amiens, the largest Gothic cathedral in France, has but three, one of which is a slender flêche on the roof, it is apparent how completely the author of this design, in his search for the picturesque, has failed to recognize the just limits to variety. His two fronts have also five different gables, of various shapes and sizes, but his imagination gave out with completing his towers, since the six show but three different sorts. It would seem impossible for the picturesque to be pushed to further extremes of absurdity.

All the examples of churches we have seen in this chapter illustrate an attempt to obtain a picturesque effect through sheer variety



Fig. 26.

of form. It must be very clear that their authors were not happy in their efforts, chiefly because they took this one element and made a secondary character the chief. It is possible this result would have happened in any case, whether the building was a church or not; but certainly these designs show that such a system of wild unreasoning

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variety is wholly out of place in the sacred structure of the Christian church.

A second class of churches, and a large one, is formed of those which are agreeably picturesque, yet which must be objected to for that very reason. In such buildings an agreeable aspect is made the chief quality, and their authors become so absorbed in trying to obtain this end that they think of nothing else. A commendable quality, and a desirable one, in the right place, it becomes almost offensive in a Christian building when it is substituted for the Christian element. What would be thought of a Christian minister who constantly recited the literary compositions of pagan authors in his pulpit, and never so much as once opened his mouth on the subject of Christ and His Gospel? The form of such a discourse might be more beautiful than that which he would compose himself, it might be couched in better language, it might give vent to a nobler æsthetic feeling than anything he might say of his own volition. But it would not be Christian, nor would such a minister be thought to be fulfilling the proper function of his high and holy office. Yet is not this the very thing that happens when the architects give us picturesque churches instead of Christian ones? Surely, it is putting artistic ideas into an un-Christian language, which is precisely what the preacher would be doing if he were to recite the tragedies of Euripides. And what is un-Christian in the one instance is un-Christian in the other, and unless we have a Christian language that can be translated into the forms of art as well as into the spoken speech of man, we are certainly deficient in a powerful adjunct for the spread of the Gospel; aye, deficient and ignorant of it.

It is important to remember this, for the beauty of the picturesque is as fascinating and delightful to the eye in a church as in a dwelling or a structure of pleasure. We are too much accustomed to consider that if the forms of a building are agreeable, if their combination is happy, if the result is pleasing, it must be satisfactory. And if that were the end of architecture there would be nothing more to be said. Church architecture, however, as has repeatedly been said in these chapters, is something more and something different. It does not stand on the same level as the architecture of our houses, our theatres, our hotels, our office buildings. It has a duty towards God and man which no other class of building has. We must give it a quality that will mark it off from other forms of architecture, and distinguish it from that which we would use in structures exclusively secular. This is not a distorted position, nor a strange one, though we have forgotten its truth so long that we will forget it altogether unless we keep it constantly before us.

So the eyes of the Christian should not be dazzled with picturesque churches, nor should ministers and religious organizations when they are building temples for God's worship be deceived by pleasant forms, nor by cunning contrivances. These things are not to be wholly despised and ignored in the church building, but when they dominate it and absorb it they become like to some noxious weed, that, entering the garden little by little, ends in overrunning it, until the flowers and fruits are choked and destroyed in its malicious embrace. And this is what the picturesque is doing for our church architecture, if, indeed, it has not already accomplished it.

Figures 22, 23 and 24 show three churches from the same hands, in which a feeling for the picturesque is the dominant one. The designs are not of equal merit, nor are they devoid of a certain eccentricity, but if one were to ask, What was the end sought by their designers? there could be no delay in the reply, To obtain a picturesque design. The complicated plan, for buildings of such small size, the many parts and the strangeness of some of the shapes, all point to an effort after the picturesque, as the end most desired. The architect's aim was to obtain pretty little churches; they did not think of making Christian buildings.

In Figure 25, a sketch for a proposed country church, we have another example of the same tendency. The side walls are unusually low; the roof, by contrast, unusually high, and the ponderous tower is almost eccentric in its dimensions, for while it reaches in to almost half the width of the church roof, it only carries a short spire much smaller than itself. The design is simple, yet in every part its authors use the most exaggerated forms; it is as though they spoke constantly in the superlative degree when an ordinary form of speech would have sufficed. And they never would have done so had they approached the subject in a truly Christian spirit; but seeking the picturesque they fell into grievous error, even with so simple a problem as here proposed.

Figure 26 is a design that might be bracketted with the previous one. We have here an excellent opportunity badly used. For, manifestly, the author of this design had no other thought in his head than the securing of a pretty piece of design, which might, perhaps, harmonize with the surroundings, and which, as a bit of design, might have some grace. That the building is odd and straightforward is not to be denied, but its author wanted only a striking little building, not a structure that would tell of Christian manliness and courage, of the battle between right and wrong, of faith and hope.

BARR FERREE.

(To be continued.)

A CHICAGO SEWER. — One of the largest sewers in the world is to be built in the Eighty-third Street district in Chicago. It will be 16½ miles long, 12 feet in diameter, and will cost $1,295,000. — *N. Y. Evening Post.*



THE ART INSTITUTE. — ARCHITECTURAL DRAWINGS BY PUBLIC SCHOOL CHILDREN. — THE DECORATION OF THE PUBLIC LIBRARY. — MOVING A CHURCH. — REMINDERS OF THE WORLD'S FAIR. — BEAUTIFYING (?) A CITY SQUARE.

OUR summer has been such a steadily warm one, and the autumn so exceptionally fine, that it is hard to realize that winter with its new plans for work is close upon us. The starting-up of the schools is one very visible proof of the season's advance.

The Art Institute begins its school year under the most favorable circumstances. About three hundred pupils registered on the opening-day, and the secretary, Mr. Carpenter, felt that without doubt there would be an increase of from thirty to fifty per cent in the attendance over last year, at which time the school was deemed one of the largest in the country. So far this autumn the receipts have been twice as large as they were last fall. Many of the old students have returned, which, of course, is of great advantage to the school, as the work done is consequently of a higher grade. The staff of teachers is about the same as heretofore, though additional help has been obtained for the lower grades to help the preparatory classes through the difficulties of the first years. Additional facilities have been added for the night work, especially in architectural classes and the classes in mechanical drawing and design. The bread-winners have, consequently, a better chance to pursue their studies at the Institute than ever before.

An interesting though far from beautiful exhibit in the galleries during September has been the work of the public school children. It was attractive in the same way that Dr. Johnson used to find a woman-preacher attractive; he found her like a dog walking on its hind legs, a wonder, not that she did it well, but that she did it at all. The little free-hand work and flat drawings of the school is an old story, but that children should be taught anything of the art of architecture seems to one who for a good many years has had little to do with a grammar school, like an innovation. The different styles of architecture are illustrated by drawings by the children, a written description accompanying each sheet. The drawings are of the crudest and the descriptions, though always embodying the main truths, curious as specimens of abrupt composition. But this is a step in the right direction and will, doubtless, implant in many a mind the a b c of architecture which will not be forgotten through life and will do away with such gross ignorance of the subject as is often found in the adult of to-day.

Added to these architectural descriptions were many little architectural sketches, some of them not at all bad, considering the age of the draughtsmen. The subjects were not tumbled-down mills and impossible dead trees, but real live every-day houses and must lead to observation, and later to appreciation of the buildings which are on every side. The idea of placing the work in the Institute was to attract the parents and children to the galleries and generally to stimulate the art feeling throughout the city. It is the first time here such an exhibition was ever placed in a similar institution, but the crowds of children with parents and friends who have visited the collection, show that the hope that this would attract them to the place was not a vain one. Once within the charmed precincts, subsequent visits follow as a matter of course. The Saturday morning classes, which are the ones given up to the children, are largely attended and filled with very enthusiastic students.

In the educational exhibit of the World's Fair, as many will remember, there was a most interesting display of drawings done by the little Japs in the higher primary schools. It was all brush work, India ink on India paper, and, when the age of the children was taken into consideration, was very remarkable for its character, its freedom and generally artistic handling. Compared with it, the work of our children is simply ridiculous, and makes one feel that our little almond-eyed neighbors, who are said to waste no time in crying, must have used this time thus gained to good advantage and were far ahead in intelligence and skill of their flaxen-haired contemporaries on this side of the water.

A most interesting exhibition of designs is one only a few steps from the Art Institute in one of the unfinished rooms of the, as yet, unfinished Public Library. The Library Board has decided that the interior of the Library should be a thing of beauty, and consequently schemes of interior decoration were called for on a basis of design given by the architect. From these the Board could make its selections. As the materials to be used were to be of a costly nature, specimens were called for to accompany the designs and models. Only two or three firms complied with this demand fully, and consequently, as was perfectly right and proper, such firms were the only ones which actually entered into the competition. The Tiffany Company made the most elaborate display and have been awarded the contract for all the important decoration of the building.

The decoration of the reading-room is a copy of the fine hall in

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the Ducal Palace of Venice. As is usual with the Tiffany decoration, the barbaric splendor of the Byzantine style is the feature most to be noticed, while an attempt is made to keep the designs of an Italian Renaissance character in keeping with the exterior of the building. Semi-precious stones, mother-of-pearl, verd antique and Connemara marbles are only part of the valuable materials used in the models which in themselves are valued at over two thousand dollars.

The Washington-Street entrance, which is the main entrance of the building, is to be rich in marbles and glass mosaic-work. The walls, the grand stairway, the balustrades and the panels will all be of white marble, inlaid with the Favrile glass, mother-of-pearl and semi-precious stones. The ceiling is panelled in alternate hexagons of plain white marble and white marble inlaid with delicate tracery of green and gold. The floor is of Roman mosaic, of various rare marbles, Sienna, Numidian and the royal green marbles. In the panel of the balustrades, the light-green marble of Connemara appears in combination with a border of opalescent green and pearl mosaics.

Opening out of the stairway of the second story is the delivery-room, which is covered with a spreading dome of yellowish Favrile glass. This gives the color-scheme for the room, whose light warm tints harmonize well with the white marble of the hall and stairways.

The next room is the reference-room, naturally a large apartment, which has for its color-scheme a curious combination of sap green, Pompeiian red and gold. The dado, which is about fifteen feet high, is of a dark greenish blue, while the walls above it are kept much lighter, the three principal colors being combined are stippled on them till they reach the frieze. Panels, bearing names of authors, divide the frieze, while the ceiling is broken into panels where the light reds and blues are combined in high relief on a gold background. The most striking and bizarre decoration is in the reading-room, where the most daring combination of colors is used. The floor is of marble mosaic; then comes the base-board of verd antique, while upon this rests a high wainscoting of Sienna marble. From this wainscoting between the windows, pilasters rise to the ceiling. They are decorated in relief in iridescent greens and blues. The same colors prevail in the ceiling, which is decorated with panels in high relief.

The good taste of so completely covering all space with the work of the decorator seems, perhaps, questionable. In the hall and stairways the fine combination of good design and material makes the scheme especially successful, but in some of the other rooms perhaps there might come longings for such work as is being put into the Boston Public Library, for instance, by some of the best artists of the day. In fact, while the work to be done is the very best of its kind, yet it seems very questionable if the public is not to be dazed by glitter and gorgeousness rather than be really impressed by true art, so that outside critics will have some justification in pointing to it as a sample of Chicago's taste for display and general loudness. Naturally, the destroying element of smoke in Chicago always has to enter into the thought of the decorator, and, of course, the glass, marble and mosaic work is best fitted to withstand such attacks from the enemy, but there is much in the designs accepted which will fall a rapid prey to the destroyer.

Besides the work in the entrance-hall of the Marquette Building, previously spoken of in these letters, the Tiffany Company is also just now decorating Christ Reformed Episcopal Church in the southern part of this city. To church-work and especially to churches of a certain character, the Tiffany work seems admirably adapted.

There has already been mentioned in these letters a plan that was being discussed for moving and raising a heavy stone church, spire and all. This proposed work is now under way, and about sixty days from the time of starting, the old structure will be resting on its new foundation, fifty feet south of where it has heretofore stood. The object of moving the church was to gain light on its north windows, as well as to permit the light to enter the south windows of the Hotel Metropole, which is its adjoining neighbor. The work has been undertaken not only by the congregation of the church itself, but by the hotel proprietors, as both structures in their former position were mutually harmful to each other. Of course, the undertaking was a much more difficult one than to move any large apartment or commercial building, for the church consisted of a large hollow space with a roof unsupported by partitions or piers. The body of the church is stone, while an addition is of brick. It has a ground area of 92′ x 110′, and a spire 150 feet high, 90 feet of which height is of stone masonry. The structure is a heavy one, it being estimated that it will average from six to nine tons to the lineal foot, three thousand tons in all. In an interview, the contractor who has charge of the undertaking says, "The church must be raised 6½ feet to bring it on a level with the new foundations. Then it must be rolled along fifty feet and set down plumb and even on its new foundation. This is how the work will be done: Long iron anchor-rods will be passed through the walls at the spring of the roof-trusses, so that the walls cannot bulge. The workmen will cut channels through the walls at foundations at intervals of six feet. Through these holes heavy steel I-beams will be passed. The ends of these steel beams will rest on crib-works of 6″ x 6″ timbers, cap timbers having been first installed for the jack-screws to rest upon. In this way, 2,000 heavy screws will be put in position for use.

"At this point the delicate work of lifting will begin. One hundred and twenty-six men, well trained to the work, will be put in charge of the screws, each having his own stint to care for. At a given signal every man will give a quarter-turn to each of the jacks in his charge. Thus the whole building will be raised a fraction of an inch. When the next signal is given, all the levers will be turned another quarter revolution. As the building goes up, new timber-work is built under the walls until at last the mass of stone and brick stands on stilts almost seven feet high.

"Preparations will then be made for the rolling operation. Heavy timber runways, or tracks, will be built every six feet in the direction of moving. Then the rollers will be put in position under the walls and the church will be a portable affair. But to set in motion every part at the same time and at the same rate of speed is a nice part of the work. Several hundred jack-screws will be installed on the side next to the Metropole. Fifty-seven men will man them, and when the signal is given, each man will turn his lever just so much — no more, no less. In this way the mass will be moved about nine inches a day.

"When at last the building is brought directly over the new foundation piers it is lowered into place by exactly the reverse of that by which it was raised in the outset. The steel bolsters are removed, the holes in the walls are filled up and the anchor rods are withdrawn."

This is a mammoth undertaking and if successfully accomplished, as there appears to be no doubt of its being in the mind of the contractor, will certainly be a marked feat, even in this city of frequent movings.

The exact opposite in point of size to this work is one which has been completed this month and which was exhibited in a private view to the architects of the city, before being sent to the Cotton States Exhibition at Atlanta. This is the miniature of the World's Fair. Before returning to Chicago to be placed before the public it will have been exhibited in Cincinnati, Louisville and Indianapolis. The model is 1-144th of the size of the original and cost $60,000. Seventy-five workmen have been busy a year and a half on the model. Many of the men came from the Pullman shops and were used to fine work in woods. The undertaking was accomplished by means of reduced plans taken from the actual World's Fair drawings. The lighting of the grounds is extremely well managed, the smallest of electric lights being used. Even the dome of the Administration Building shines forth as it did in ninety-three, and the reproduction of the statuary around the minature grounds is really quite remarkable. For sending to Atlanta the model will be packed in sixty sections.

It is curious how long reminders of the Fair stay by us. Now the Ferris Wheel, about whose location so many wild reports have been circulated, raises its mighty proportions in the northern part of the city. In spite of injunctions from the neighboring property-owners, and all sorts of set-backs since the first of last April, when the ground was broken for the foundation, the whole is at last completed, and one hundred and fifty invited guests sat in its hanging cars and made the first revolution since the days of the merry Midway. It probably will not be formally opened to the public this fall, but when it does turn, something which will be known as "Old Vienna" will be situated at its base.

Still another reminder of the Fair is the report that comes from Springfield of the permanent State Fair buildings and the incorporating into one of them of the dome from the Horticultural Building of the Exposition. The cut which was published in the papers shows a building with a dome rather out of proportion, but fairly well managed and one which evidently suits exactly the requirements of the case. It is to be used for the dairy exhibit and being circular in the interior will do away with the jealousy which previously has always existed on account of the different positions given to different exhibitors. The dome rises from a quadrangular base, forming annexes at each corner, which give it a not unsymmetrical outline and proportion, although, as suggested before, the general appearance of the building is that of an overgrown soap-bubble, despite the effort made to line up to the dome. It was, however, a pleasant enough thing as far as association went to save the structure, and a wise arrangement too, perhaps, when one considers the appropriate shape of the building for its use.

No action has as yet definitely been taken on the part of the City to further the plans for the improvement of the Lake-front as proposed by the Municipal League. The whole subject is now in the hands of the City Council to ratify the arrangements made with the Illinois Central, and definitely decide upon the general scheme of improvements and the laying out of the grounds.

If nothing has been accomplished on the Lake-front, wonders have at least been wrought by the City in a little North-Side square, between the Newberry Library and the Union Club, a grassy little spot for children to play in and old men to rest in, between Clark Street with its rumble of cable cars and Dearborn Avenue with the clatter of horses' hoofs on its asphalt. In the centre of the square was an inoffensive iron fountain painted green, into whose basin the children threw sticks and stones in summer-time and clambered in and out of, in the snow in winter. But alack! on an evil day it was found that in someone's will provision was made for a bronze fountain to be erected in this same square. Promptly on learning this that part of the city force having this square in charge proceeded to put the place in readiness to receive its gift. The old

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iron fountain was promptly removed and its basin filled up, while around it was built a wall of concrete or rubble about six feet high. Around this wall a concrete curved seat was constructed, minus a drain, so that its ability to retain moisture is limitless, while at each corner some horrible little square towers were erected, expected in time to harbor drinking-fountains, but at present being useless monstrosities bearing aloft dishes of flowers. The man in charge circulates the report that no design was made, and that it was just a simple outburst of genius on the part of the workmen who were sent to construct something for the reception of the fountain. What kind of a fountain would not be struck by an everlasting drought at the sight of such a thing it would be difficult to picture, and how the beneficent giver can rest quietly in his grave would be hard for any self-respecting ghost to understand. The people whose houses adjoin the park would be amply justified in resorting to dynamite rather than be obliged to gaze at this thing day after day.

The Chicago Exhibition Company, which had on hand the construction of the big Coliseum, whose collapse was discussed in last month's letter, now announces that contracts are already let for its reconstruction, that this time no undue haste will be required as to its date of completion and that, before the building leaves the hands of the contractors, a thorough investigation and test of the structure will be made by the best known engineers.

THE NEW ST. LOUIS.

IT is quite possible for a New Englander standing on the levee at St. Louis to get a whiff of that physical sensation of being in a foreign land which constitutes one of the most vital of the charms of travelling. The muddy water of the Mississippi tumbling along at the foot of the steep incline of the levee, the levee itself, the strange form of the river steamboats with streams of undiluted soot pouring out of the crown-shaped tops of their slender twin smoke-stacks, and the groups of colored roustabouts, in all kinds of dishabille, furnish a setting of the scene that gives a distinctly foreign flavor to it all. The inhabitant will tell you that the scene has little of the spirit and vivacity of the days before the river steamers had been worsted in the competition with the railroads — but it has not lost all its charm and has still left a good deal of its former bustling gaiety. Mentally compare the possibility, so far as speed is concerned, of shipping freight by boat and by rail and the inference is in favor of the railroad, unless the charges are unduly high, and competition between the various roads has brought the rates down to a point where the greater economy of freighting by water is overbalanced by the saving effected through the speedier transport by land. As for passenger traffic, the comforts of the somewhat tawdry water-palaces of *ante-bellum* and immediately *post bellum* days are quite outdone by those of the palace-car, and professional gamblers and stiff "jackpots" are not unknown in the compartments of a palace car. Civilization has got beyond pistols and bowie-knives, but the autocratic palace-car porter is a poor substitute for the attentive waiter who understood that he could be sold "down river" if he did not prove sufficiently attentive and careful.

As travel by water decreased, so travel by land increased, and the busy throngs and the crowded tracks at the great Union Station at once mark what the river-men have lost, and show what an important place this metropolis, placed practically at the geographical centre of the country, has become. From the standpoint of the railroad man the depot is extremely well arranged, and the reasonably intelligent traveller finds there are not many questions he has to ask. From an engineering standpoint, the manner in which the thirty or more tracks are covered by a single roof is extremely interesting, and the lightness of the steel roof-trusses is conspicuous. The habit of the practical American of taking care of himself in his own way, and that way the one which will cause him the least trouble, is shown at this building in a way that must be disappointing to the architect and to the Terminal Association who own the building. The street-level in front is at half height of the lower story, so that one descends a half flight to reach the ticket-office, news-stands and exits to the track platform, or ascends a half flight to the large general waiting-room. It was expected that the hundreds of passengers who are always waiting about a large station would naturally make use of this room, but the simple fact that it is an easier thing to carry hand-baggage down stairs than upstairs sends the great proportion of all passengers to the lower room and platform, which in consequence become unduly crowded, while the great room upstairs is practically deserted. Indeed, that this was to be the fate of the room seems to have declared itself so soon that the managers seemingly have not thought it worth while to provide more than a few seats and benches. To have so fine a room as this one, decorated with much propriety and artistic success, prove to be little more than a "good advertisement" of the building, must be not a little disappointing to all concerned. The managers seemingly must shoulder the responsibility of the mistake, if it be one, as it ought to have been a matter of common knowledge with them that the public would not climb stairs, if possible to avoid them. If it can be conceded that a picturesque treatment is the one most appropriate for a great terminal station, then it must be acknowledged that Mr. Link has achieved a success, and though there are some features that might have been modified with advantage, there is comparatively little about the design which in future years he will look upon with the regret that a more simple treatment had not been adopted. The building suffers through having not enough space in front of it, and as there appear to be within the limits of the city itself very little in the way of small parks and open squares, it is to be hoped that, at some time or another, the city will lay hand on a block or two in front of the station and lay it out as a park or garden.

This absence of parks has, apparently, led to the building of houses in a way that gives the city a characteristic air of its own. While there are blocks of houses built in solid rows, the greater number of houses toward the west side of the town are built isolated in the middle of small lots, so that a certain airiness and openness of aspect is secured at the expense of that more perfect privacy which is the attribute of the house built in the middle of a row. This local peculiarity has been taken advantage of in certain parts of the last-built quarters and several blocks of land have been set apart by the owners as "places," and the land sold only to those who were willing to build houses of, at least, a fixed minimum cost and a certain architectural value. Entrance to these places is had through gateways, each differing in design from the others and all of marked architectural excellence. This fashion of making these semi-private places seems to be extending and these gateways bid fair to be one of the distinctive features of St. Louis.

Within these places will be found houses of greater average excellence than we have ever seen elsewhere grouped within a similar area, houses mainly the work of the younger men who are making such telling marks in every section of the city in buildings of every description. While the style is varied and the work of the different men can be discriminated, there is a general tendency to work in a modification of the French Renaissance rather than in the Italian Renaissance which is now being so effectively used in the East. Its more varied and picturesque lines comport better with the semi-suburban character of the surroundings, than would the more formal lines of the Italian school. Now and then one comes upon a house that suggests the Lake Shore Drive in Chicago and reminds one how much better chance these young men have than their fellows had when they were building up Chicago in that style which was vainly imagined to be Richardsonian. St. Louis, or its inhabitants rather, has been supposed to be chagrined that Chicago has outstripped her in progress and development, but we fancy that in all that concerns architecture the tables are likely to be turned, and that before long St. Louis can boast of possessing a more refined architecture than has the big city by the lake. The work of rebuilding St. Louis, which must be done, is still to do and it is her good fortune that this rebuilding is likely to be done in an American adaptation of Renaissance rather than in such gross interpretation of Romanesque as has overloaded Chicago and given the general architectural character of that city so pronounced an air that it will be very long before any change of fashion in architectural style can do much to ameliorate it.

The St. Louis speculating builder is quite unconsciously playing into the hands of the St. Louis architects. He has noted that they have adopted a new style and are using a great variety of materials, and by so doing have produced some most charming results which have enhanced the value of surrounding property. To change his style (as he understands style) and use a great variety of material is for the speculating builder an easy thing to do, and he has proved it. He has run up hundreds of houses of the most variegated colors, wrought in the most extraordinary forms, which he supposes to be Renaissance, and has brought them into as close proximity as possible to these select "places." But the American citizen, now that he has begun to pay attention to matters of art, is proving himself to be a person of not a little discernment and power of discrimination. With examples of what is fairly good and what is positively bad set before his eyes at the same time he, apparently, has no trouble in deciding which is which, and which he is willing to spend his money for. The result is that the speculating builder finds few "takers," for there are hundreds of these eccentric creations standing tenantless and giving to that part of the city the air of being greatly overbuilt.

The business portion of the town does not have the air of individuality that the new semi-suburban district is acquiring. The early wooden and low brick warehouses have been very gradually replaced by higher and more elaborate buildings, the general character of which is neither better, worse, nor very different from buildings erected about the same time in any other city. The more modern structures, those belonging to the "insurance-building" period appear to have been built at different times and only to meet an apparent demand, that is, the growth seems to have been a natural one, not a "boom" growth. Booms are usually brought about by the injection of outside capital and alien interests, and it is the boast of the citizens of St. Louis that the city owes its development to its own resources and the energy of its citizens and only very slightly indeed to "Eastern capital," which has played so important a part in the building-up of Chicago. Here and there, indeed, can be found important buildings designed by Boston, New York or Chicago architects, and it is possible that the money that paid for these buildings was not drawn from St. Louis purses, but we believe that the boast that St. Louis has created her own greatness, is a well-founded one. How long this boast can be held good seems doubtful, since at this writing the newspapers report that there is on the point of consummation one of the largest real-estate speculations which has ever undertaken to affect the development of a city,

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by which "Eastern capital" to the volume of twenty-two millions of dollars is to be employed in reclaiming and developing that part of the city bounded by Third Street, Main Street, Market Street and Washington Avenue.

SOCIETIES

THE ENGINEERS' CLUB OF PHILADELPHIA.

AT the regular meeting, October 19, 1895, seventy-nine members and visitors were present.

A general discussion on the durability of iron in modern building construction was opened by Mr. W. C. Furber, who prefaced his remarks by stating that the subject was one which very few professed to know much about, and that it was hoped that this discussion might cause a general interchange of the information possessed by members. From direct experimentation on rust-prevention, he had been able to add but little to existing knowledge, and would, therefore, give principally the results of those who had spent more time in studying this subject.

The preventing of corrosion consists in first cleaning the metal by means of pickling, and then applying the protective covering, the latter, of course, depending upon the use and location of the material to be protected. It has been found necessary to pickle the plates forming the hulls of vessels, and it would, therefore, seem to be even more important to use some means to prevent corrosion in those parts of a building which cannot be examined after erection. In high buildings, which have become the order of the day, the decay of the main lines of support, through corrosion, would involve problems of responsibility and cost, which those connected with their design and erection cannot but thoughtfully consider.

Most of the information that we have on the subject of rustless coatings for iron and steel is the result of the valuable work performed recently by Mr. W. P. Wood, of the American Society of Mechanical Engineers, from whose papers many of Mr. Furber's statements were quoted.

The coverings available at present are paints, bituminous coatings and cement, and all three can often be used on the same structure to advantage. Cement properly applied has many advantages over other coverings, and may be said to be the most efficient, on account of the ease of its application. Heretofore, it has been used mostly on such parts of the structure as are below ground, but there seems to be no good reason for not using it to cover the other parts of the structure as well.

Mr. Furber then read a number of extracts from articles concerning rustless paint, cement coverings for ships, and asphaltic, graphite and carbon coverings, and at the conclusion of his remarks some samples of metal from the Tacony Iron and Metal Works were exhibited, showing the iron with the natural scale on it as it comes from the roll, and other samples which had been pickled.

MR. C. D. RINALD: Rusting takes place by the combination of oxygen with iron which has first been combined with an acid, generally carbonic. Iron which is slightly rusted will attract more moisture and continue to rust under conditions where clean iron would remain so. Although black oxide is a very good protection, it is only used for small articles because it is very hard and extremely brittle; and where it breaks off, a small spot of red oxide will form, as can be observed very often on wrought-iron signs treated in this way. Of course, when any kind of protection is mechanically removed, there is nothing to prevent the iron from oxidizing. Linseed-oil is the best material to use for rustless coverings. Though I do not know very much about coating iron with cement, I know that coating it with lime is a very good method of preventing rust.

MR. CHARLES M. MILLS (visitor): While chemical investigations are very valuable, it is not safe to accept them unless they are confirmed by actual experience; and in this matter of rust prevention, it would seem that the time has come to deal scientifically and systematically with the subject. While the quality of steel and iron is carefully dealt with in the specifications for bridges and other structures, only a very subordinate place has been given to the important consideration of protecting the material. The value of paint depends upon the climatic conditions which prevail where the structure is, and the artificial influences to which it is exposed. It would, therefore, seem to be a good plan for this, or some other society, to secure the coöperation of the chief engineers of railroad systems, and establish a certain group of points where experimental tests should be conducted; for instance, one near the Atlantic Coast, another in the Mississippi Valley, another near the Gulf of Mexico and another on the Pacific Coast; and then endeavor to have a certain number of structures in these different localities painted with compositions selected as the best by a committee who would also make sure that the component parts of the paint were pure and of uniform quality. It seems to me that the importance of determining the best preservative for their buildings and bridges would lead railroad companies and the owners of other structures to coöperate in an intelligent effort of this kind, and the results would probably be of great value.

MR. EDWARD K. LANDIS: Although some claim that asphalt paints have great resisting power against atmospheric and other influences, the experience which I have had with these materials under the action of laboratory fumes has not corroborated this testimony. This experience would seem to show that asphalt is more or less porous, and that the moisture passing through the pores rusts the iron underneath and causes the whole coating to peel off.

MR. JAMES CHRISTIE: I think that no matter what oil or covering material you use, unless the metallic surface is first clean and free from scale and rust, it will not be efficacious. The composition of the iron undoubtedly has much to do with the facility with which it rusts, and I think it has been proved that when there is a considerable percentage of nickel, the iron does not readily corrode. Unfortunately, the present price of nickel makes such a composition too expensive. It is also claimed that very pure iron is extremely susceptible to corrosion. About seven years ago I noticed, in visiting a concern in Middle France, that they prepared light rails, etc., by passing them first through machines where the surfaces were scraped thoroughly by revolving brushes of stiff wire, so that they were thoroughly cleaned, after which the iron was passed through a large tank, where it was thoroughly coated with a varnish applied by stiff brushes. The process seemed to be cheap and very thorough.

MR. F. SCHUMANN: I doubt whether a paint will ever be discovered that will be a permanent protection to iron, and I believe that permanency of metal construction will depend on continual watchfulness. A building or other structure should be designed so that the vital parts can be readily gotten at, instead of which we see some of our large buildings being put up with columns entirely enclosed with brickwork, and if any corrosion should take place at the base of these columns, their increasing weakness would be only a matter of time.

MR. A. FALKENAU: I know of a case in New York where a builder insisted upon having the outside of a large building paraffined from top to bottom, for the purpose of preventing moisture from being driven through the wall. Experiments previously made had shown that water could be driven through a wall which was 3½ feet thick.

MR. WILLIAM BARR, JR. (visitor): It seems to me that, first of all, a high structure should be a strong one, and in building construction I think it well, if possible, to have the parts exposed, so that they can be examined and treated after erection if necessary. After a very thorough search into the literature on the subject of our discussion, I have found that the consensus of opinion seems to be that red lead is the best preservative.

MR. FURBER: I should have been glad to have heard more discussion on the subject of coating with cement, as I think that if properly applied, it will prevent the iron from corroding for an almost indefinite period.

MR. CHRISTIE: I know of a case where columns made out of angle-iron used to support boilers in a place where there was much water, were covered with a mixture of sand in hydraulic cement, and after fifteen years, when the work was again examined, the iron covered by the cement was found to be in perfect condition, whereas it was considerably eaten in the parts exposed to the corrosive action of the water.

MR. GEO. S. WEBSTER: With regard to the deterioration of iron in highway bridges under which locomotives pass, it seems almost impossible to effectually protect the metal. There are two bridges in this city in which an effort has been made to cover the girders by a white-pine flooring painted with an asbestos paint. It remains to be seen whether this will resist the action of the locomotive gases.

L. F. RONDINELLA, *Secretary.*

THE FLAGSTAFF OF THE CATARACT CONSTRUCTION CO.: A CORRECTION.

THE publication in our issue for September 28, of a drawing of the base of the flagstaff of the Niagara Construction Co., has brought out protests from two directions.

On the authority of the gentlemen who made the drawing we associated with the architects' names that of Mr. MacMonnies as the sculptor. This led Mr. W. H. Mullins of Salem, Ohio, to say he felt that his name and the names of his modellers should be associated with the work in place of MacMonnies's, and later Mr. Stanford White wrote that "Mr. MacMonnies had nothing to do with the flagstaff in question, which was designed in our office."

Scribner's Magazine for November, however, contains an article on the work of Mr. MacMonnies, from which it appears that he did model the seal of the Cataract Construction Co., which Mr. White included in his design for the base and which apparently has caused the confusion.

FIRING AT WAR-BALLOONS. — Some experiments have been made lately in Austria to test the chances of a war-balloon being hit when fired at. A captive balloon at an altitude of about 4,265 feet was fired at from a distance of 4,400 yards, and was struck nine times without being brought down. In a second trial a captive balloon, at a height of about 2,625 feet, was fired at from 5,500 yards distance. A violent wind, causing the balloon to plunge a good deal, rendered the aim very difficult, and the balloon was not brought down until the fifty-sixth round. — *Philadelphia Record.*

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ILLUSTRATIONS

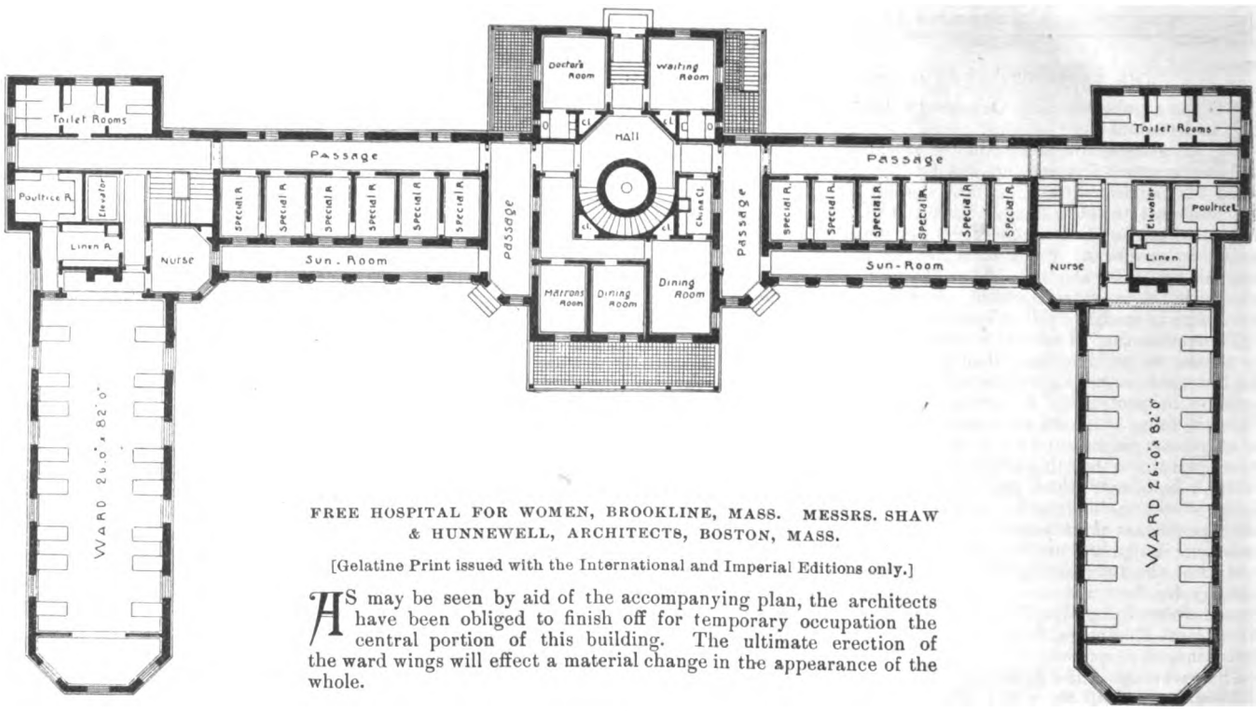
[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

EXTERNAL STAIRCASE TO CHURCH AT BINDLACH NEAR BAYREUTH.

This plate is copied from *Architektonische Rundschau.*

INTERIOR OF THE SCHLOSSKIRCHE, WITTENBERG, MECKLENBURG-SCHWERIN.

This plate is copied from *Zeitschrift für Bauwesen.*



FREE HOSPITAL FOR WOMEN, BROOKLINE, MASS. MESSRS. SHAW & HUNNEWELL, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

As may be seen by aid of the accompanying plan, the architects have been obliged to finish off for temporary occupation the central portion of this building. The ultimate erection of the ward wings will effect a material change in the appearance of the whole.

CITY MARKET, SPRINGFIELD, MASS. MESSRS. GARDNER, PYNE & GARDNER, ARCHITECTS, SPRINGFIELD, MASS.

HIGH SCHOOL BUILDING, SOMERVILLE, MASS. MESSRS. HARTWELL, RICHARDSON & DRIVER, ARCHITECTS, BOSTON, MASS.

PROPOSED FISKE MEMORIAL LIBRARY, WRENTHAM, MASS. MR. D. H. WOODBURY, ARCHITECT, BOSTON, MASS.

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[Additional Illustrations in the International Edition.]

FREE HOSPITAL FOR WOMEN, BROOKLINE, MASS. MESSRS. SHAW & HUNNEWELL, ARCHITECTS, BOSTON, MASS.
[Gelatine Print.]

THE MYSORE GOVERNMENT MUSEUM, BANGALORE, INDIA.

This building was designed by Major Sankey, R. E., when Chief Engineer of Mysore (1874), to supersede the then existing tumble-down building in Shûlé. The foundations of the building gave a good deal of trouble, the site being partly on very shelving rock, upon which there was an enormous boulder, whereas on the opposite side the foundations were on numerous picottah wells, several of which had to be filled-in with concrete, this portion of the site being on an old garden. The building was completed in 1877 at a cost of Rs. 44,628.

The view is copied from *Indian Engineering.*

THE MAYO MEMORIAL HALL, BANGALORE, INDIA.

This building was erected to the memory of the late Lord Mayo, partly from money raised by public subscription in the Mysore Province, and partly from funds given by the Bangalore Cantonment Municipality. The design was by Col. R. H. Sankey, R. E. The building was completed towards the end of 1881. The total cost of the building (exclusive of the out-offices, etc.) was Rs. 44,960. It is used as the Court and Office of the District Magistrate of the Civil and Military station, and President of the Municipal Commission, but is hired out for occasional balls during the season, as also for "public meetings." The court-room, upstairs, is a handsome one, and one of the best for dancing in Bangalore.

The view is copied from *Indian Engineering.*

SUN-DIAL, WHATTON HOUSE, NEAR LOUGHBOROUGH, ENG. MESSRS. BREWILLE & BAILY, ARCHITECTS.

The original drawing, which we copy from a reproduction in the *Builder*, was hung at the last Royal Academy. The group is executed in Portland stone, the four figures upholding the dial representing Clio, Euterpe, Erato and Urania.

PULPIT IN THE SCHLOSSKIRCHE, WITTENBERG, MECKLENBURG-SCHWERIN.

This illustration is derived from the *Zeitschrift für Bauwesen.*

MONUMENT TO ACHILLE TESTELIN, LILLE, FRANCE. M. LOUIS BONNIER, ARCHITECT; M. A. CORDONNIER, SCULPTOR.

The sculptured figures, with the exception of the crowning bust which is of marble and the statue of the Republic which is of a light stone, are cast in bronze. The cost of the monument, which was erected last year, was only about $10,000. The illustration is reproduced after *L'Architecture et la Construction dans le Nord.*

NEW BATHS AND WASH-HOUSES FOR DEPTFORD, ENG. MR. THOMAS DINWIDDY, ARCHITECT.

Commissioners of Baths were appointed some years ago to prospect sites, and in 1890 designs were obtained in competition for adapting the old Deptford Lecture-hall as public baths. The designs of Mr. Thomas Dinwiddy, of Greenwich, were then selected, but objections were raised in the vestry to the proposed site. Another site in New Cross-road of three-quarter acre has since been bought at a cost of about £7,000, and the commissioners instructed Mr. Dinwiddy to prepare plans for the new buildings. These plans were adopted and the work is in hand. The accommodation comprises a first-class swimming-bath, 35′ x 110′, with galleries; a second-class swimming-bath, 27′ x 80′; 15 first-class and 30 second-class slipper-baths for men, and 5 first-class and 10 second-class for women. There is a public laundry, and administrative accommodation for the Board and clerk and the superintendent. A well on the site will supply the baths. In addition to the intended baths and wash-houses, the architect's instructions comprised the provision of a new vestry-hall and offices for the parish, and the illustration which we now give represents the entire project, showing the façade in New Cross-road. The plans clearly indicate the internal arrangements. The contract amount is £32,950.

This illustration is reproduced after the *Building News.*

ENTRANCE TO A RESTAURANT, PARIS, FRANCE. M. LECQ, ARCHITECT.

This plate is copied from *La Construction Moderne.*

DOOR OF THE FACULTÉ DES SCIENCES AT THE SORBONNE, PARIS, FRANCE. M. NENOT, ARCHITECT.

This plate also is copied from *La Construction Moderne.*

SKETCHES BY A LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP, MR. J. W. CASE.

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COMMUNICATIONS.

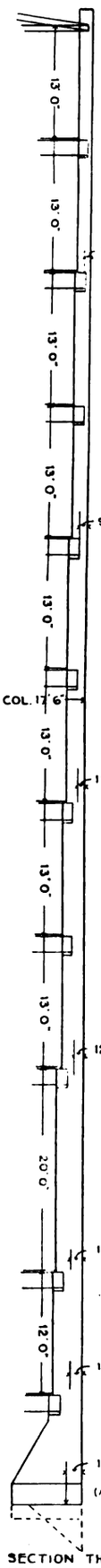
[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

HEAVY FOUNDATIONS ON THE LOT LINE.

NEW YORK, N. Y., October 22, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The following subject of almost vital importance in connection with the design of foundations in our large buildings is frequently overlooked, although it has been referred to on previous occasions. The principle of centralization of loads and reactions is well known and continually made use of in engineering design, but frequently it is lost sight of in architectural work. I therefore, believe it advisable to call attention to this fact and that an illustration will be of service. The enclosed section is that of a wall which a short time ago came under the writer's observation. The building is a nine-story office-building, interior of steel construction with beams resting on the walls. The outer edge of the wall is on the lot line. The building-law stated that the earth shall be deemed to safely sustain a load of four tons to the superficial foot, and apparently the designer considered himself justified in spreading his footings over the seven feet of width, as shown, and that the pressure had to distribute itself over this area.



SECTION THRO' BEARING WALL.

Now the above is far from the actual state of affairs. The forces called into play, consisting of the weights of masonry, floor and superimposed loads and the resisting earth, have certain fixed laws which must be followed and it is necessary to trace out their action.

These forces have distinct determinable points-of-application and the earth below has a distinct resistance with its point-of-application. It should be the work of the designer to have these loads not only equal, but their points-of-application or centres-of-pressure opposite, if possible. If the above is not achieved, these opposing forces form a couple or pair of forces acting in opposite directions at different points, which tend to overturn the foundation. In the case under consideration, a calculation of the weights of the masonry and floor-loads and their lines of gravity shows the centre-of-pressure on the earth at the foot of the wall to be 17.15 inches from the lot line.

The total weight per running foot, resting upon the earth bottom, is 56,200 pounds.

The point-of-application of the resistance of the earth is at the centre of the footing or 42 inches from the outside. These two forces form an overturning couple, its moment having a lever-arm of 24.85 inches.

Now since the earth is supposed to yield after a load above 8,000 pounds per square foot is applied to it, we can readily conceive the state of affairs and trace out the effects. The earth under the side of the wall nearest to the point-of-application (*A*) is subject to a greater strain than any other part and consequently will settle first.

This action can be likened to that of a plank floating in the water. If a pressure be applied at its centre, the whole sinks uniformly. If, however, the pressure is applied nearer one end, this end sinks more than the other because the pressure is greater at that end. This will continue as long as the point-of-pressure is applied within the middle third of the piece. If the point-of-pressure is beyond the middle third, the further end will rise out of the water, showing that this end not only carries no part of the weight, but carries a negative load, *i. e.*, there is a force at work lifting it out of the water. The amount of the pressure can be determined by calculation. Our case is practically a duplicate of this. Knowing these, we determine the following as the pressures on the soil:

Average pressure per square foot should be 8,027 pounds. Maximum at outside of wall, 22,160 pounds per square foot.

Zero at 5 feet 5½ inches from outside of wall.

Minimum at inside edge, 6,160 pounds per square foot.

If the earth be unable to stand this pressure of 22,160 pounds instead of 8,000 as intended, the only resistance to overturning the wall foundation will be the tenacity of its materials. The results of such increased pressures are frequently seen in cracks in the wall on one side and crushing of the brickwork on the other. It is fortunate that hitherto no serious accidents have occurred directly attributable to this cause; but with our increasing loads, it is playing with fire to permit this, and we cannot consider better modes of distributing foundation loads too soon.

Certain it is that this subject is of sufficient importance to claim the attention of those members of the profession who have hitherto overlooked it. Very truly yours, OSCAR LOWINSON.

[THE difficulty presented by cases in which a heavily-loaded wall, placed on the boundary-line of the lot, must be supported on a foundation of considerable spread, the edge of which cannot pass the same boundary-line, is very well known to architects, and Mr. Lowinson's warning is a timely one. In some recent buildings, the problem is solved by setting the basement wall some distance inside the lot line, so as to bring it toward the middle of the footings, and projecting the beams of the first floor over it, as cantilevers, to the lot boundary, supporting the superstructure on the ends of these cantilevers. There are obvious disadvantages in this construction, but in some cases there seems to be no better way of avoiding a couple between the load and the reaction of the earth. — EDS. AMERICAN ARCHITECT.]

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St. opened October 14.

Exhibition of Water-colors: at the St. Botolph Club, October 28 to November 16.

Exhibition of the Work of Walter H. Kilham, Tenth Holder of the Rotch Travelling Scholarship: at the Gallery of Doll & Richards, 2 Park St., November 5 to 9.

Exhibition of Work by A. M. Cobb, T. B. Meteyard and H. L. Todd: at the Cowles Art School, 145 Dartmouth St., November 1 to 9.

Photographs of the Work of Burne-Jones: at Walter Kimball & Co.'s Gallery, 9 Park St.

Illustrations of Shakespeare's Comedies by Edwin A. Abbey: at J. Eastman Chase's Gallery, 346 Boylston St.

BRIDGEPORT, CONN. — *Exhibition of Artistic Posters:* at the Public Library, November 9 to 30.

CHICAGO, ILL. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

CINCINNATI, O. — *Exhibition of Woman's Art Club:* at Closson's Gallery, opened November 4.

NEW YORK, N. Y — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice," also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Portraits of Bismarck by Walter Petersen: at Knoedler's Galleries.

Loan Exhibition of Portraits: at the National Academy of Design, October 30 to December 4.

Sixth Annual Exhibition of the New York Water-color Club: at the Galleries of the American Fine-Arts Society, 215 West 57th St., November 11 to 23.

Exhibition of Competition Drawings of the Society of Beaux-Arts Architects: at same Building, November 7 to 9.

Illustrations of Shakespeare's Comedies by Edwin A. Abbey: at H Wunderlich & Co.'s Gallery, 868 Broadway.

Works by Gerke Henkes: at the Holland Art Galleries, 329 Fifth Ave.

Sir Joshua Reynolds's "Death of Dido": at the Blakeslee Galleries, 353 Fifth Ave.

PHILADELPHIA, PA. — *Autumn Exhibition of the Philadelphia Art Club:* opens November 18.

PITTSBURGH, PA. — *Loan Collection of Paintings:* at the Carnegie Library, during November.

NOTES AND CLIPPINGS

A HIGH TOWER. — The new waterworks tower just completed at Eden Park, Cincinnati, Ohio, is the highest artificial structure in America. The floor of the tower, reached by elevators, is 522 feet above the Ohio River. The base is 404 feet above the stream. — *Invention.*

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An Indian Pompeii. — Nothing sadder or more beautiful exists in India than the deserted city of Fathpur Sikri. There it stands, some twenty-three miles from Agra, much as it stood three hundred years ago, when Akbar decreed the stately pleasure-house. It was built to commemorate the blessing of the holy Salim Chishti, the hermit who dwelt among the wild beasts in his cave at Sikri, and who had foretold that Akbar's son, born on that spot, should live to succeed him on his splendid throne. The saint did not foresee that the infant would grow up into that unmitigated debauchee Jehangir, whose orgies amazed Sir Thomas Roe and whose potent liquor caused that virtuous ambassador to sneeze incontinently, to the delight of the whole court. But the heroic toper did not defile his father's palace city, which must have been deserted soon after its founder's death; for when William Finch visited it in 1610 he found it "ruinate, lying like a waste district, and very dangerous to pass through at night." Ruinate it has remained ever since, desolate and abandoned. No later ruler of India has ever dared to live in Akbar's Versailles, just as no ruler of India has ever climbed to the heights of Akbar's genius. In the empty palaces, the wonderful mosque, the sacred tomb, the baths, the lake, at every turn we recognize some memory of the greatest of Indian Emperors. We may even enter his bedroom — the *Khwabgah*, or "Abode of Dreams" — and see the very screens of beautiful stone tracery, the very Persian couplets, the identical decoration in gold and ultramarine, upon which Akbar feasted his eyes during the long sultry afternoons of the Indian plains. We may walk into the houses of Faizi and Abu-l-Fazl, the laureate and the premier of his empire, who sang his glory and chronicled his reign. We may see that strange building, the Diwan-i-Khas, with its central pillar-throne and odd galleries, which some have sought to identify with the famous hall where metaphysical debates took place every Friday night under the Emperor's personal presidency, and philosopher and theologian, orthodox and sceptic, did furious battle for their creeds or doubts, till they ended, long after the "small hours," by bandying "pervert" and "atheist," to the disgust of an unwilling witness — the austere Badaoni. The associations of Fathpur Sikri, "City of Victory," are not its only claims to our interest and respect. Its beauty in desolation excited the poetic imagination of Heber and stirred the critical enthusiasm of Fergusson, who says of the "Turkish Sultana's house," which still overlooks the Pachisi Court, where Akbar is fabled to have played his games of living chess, that it it "impossible to conceive anything so picturesque in outline" or any building so richly and wonderfully carved without the least exaggeration or bad taste. Equally exquisite is the celebrated shrine of Saint Salim Chishti, built in 1580, with its pure white marble cenotaph, its red sandstone dome, and its veranda enclosed by delicately pierced *jali* screens of fair marble, like fine lace set in samite. And for grandeur what can compare to the stately "High Gate," Bulaud Darwaza, of the mosque which crowns the rocky plateau, and which the historian of architecture cites as "noble beyond any portal in India, perhaps in the whole world?" — *St. James Gazette.*

The Imperial Palaces of Japan. — There are thirty palaces belonging to the imperial family in various parts of Japan, but the present Emperor has never occupied more than three or four of them, and some of them he has never seen. There is a stock-farm at Nikko belonging to the mikado, and tourists are always amused at a large, oddly-painted sign which advertises milk from his cows for sale. The Emperor seldom leaves the new palaces at Tokyo, which are more modern and comfortable than any of the others and were only completed in 1888. They consist of a labyrinth of one-story buildings, all connected by covered passages and surrounding beautiful courts. Their architecture is of the ancient Japanese style, with high roofs at sharp angles and heavy gray tiles, and the interior of most of them is finished in the native fashion, with partitions of sliding screens and floor matting, which the inmates use for beds, chairs and tables, as it happens to be necessary. But several of the rooms have French furniture of ornate and expensive workmanship, much of it being rosewood, handsomely carved and inlaid. The apartments occupied by both the Emperor and Empress are furnished in that way. Both prefer to sleep in a modern bed and sit on a chair before a table, with knives and forks and china when they take their meals, but the Emperor is understood to wear the native dress, except on occasions of ceremony, and when the Empress retires to the privacy of her apartments she throws off her close-fitting waist and corsets and puts on the more comfortable kimino. — *The Churchman.*

The Italian Renaissance. — This Renaissance of Classic architecture began in Florence, under Brunelleschi and Alberti. Later, in the north, another school arose in Milan under Bramante, and these two branches finally met and produced their highest results at Rome. We tried to trace these schools in their respective fields, and it was of course in Florence itself that we found the visible first fruits of the Renaissance, so far as architecture is concerned. At Pisa, it is true, we saw how Nicholas, the sculptor, had drawn inspiration from ancient Rome models for the figures on his pulpits; but the Gothic carvers of the façades of Paris and Amiens had done as much a hundred years earlier, and the wonder is that artists and craftsmen should ever have ceased to cherish and assimilate the ancient work by which they were surrounded, and which was so far beyond their own powers. Apparently, however, for a hundred years after Nicholas, of Pisa, men paid no heed to the architectural monuments of antiquity around them. The real awakening came almost simultaneously to collectors, who were eager for jewels, coins and ivories from Greece and Rome; to scholars who with avidity sought the classic manuscripts that until then had been buried in the monasteries; to painters and sculptors and architects, who suddenly saw beauty in the models of classical antiquity, and strove to graft the antique traditions on the civilization of their own time. What the French sculptors of the twelfth century strove to imitate; what Nicholas of Pisa faintly saw in the thirteenth century; what Petrarch at Padua, and Giotto, Orcagna, and Simone Memmi in Tuscany, found in the classics to delight them in the fourteenth century, all this finally took form with the quattrocentists, and was spread by many helping spirits over Tuscany and the world. As for architecture, this movement began in Florence, and the return to detail, carefully studied upon the ancient Roman models, was abrupt and without transition. Brunelleschi was the guiding active mind, the Medici gave the opportunities, Donatello's refined genius inspired the decoration. The spirit of the Renaissance gradually became a patriotic fervor. Men thought they had reclaimed their inheritance from the Cæsars, and wondered that they had ever fallen away from the wonderful models all around them. — *R. S. Peabody in Atlantic Monthly.*

Leasowe Castle. — A great chance for the collectors is soon to occur in the sale of an Elizabethan castle, with all its valuable contents, in Cheshire, England. It is the residence of Sir Charles Cust, and was built by the Earls of Derby, when it passed from that family to the present owner's great-grandfather. It is chiefly noticeable as containing a fac-simile of the notorious star chamber, lined with the original oak panelling of that apartment. The wood is in an excellent state of preservation. The star chamber contains some fine specimens of antique oak furniture, and included in the contents of the castle are valuable old oak cabinets, chairs and other articles, which have been in the mansion since the sixteenth century. Nearly all the subsequent changes of taste are represented, and the collection of Chippendale is of unusual importance. It makes the mouth water to think of all these treasures which are to be dispersed by auction, but the wise American who is also rich will secure the star chamber and bring it over here, where it can be set up in a brand-new house, a veritable star of antiques. Save for these forced sales of family relics abroad, people with fine tastes to gratify would not fare very well. But the fallen fortunes of one are the happy accidents of others, and so, it is presumed, some rare pieces of old furniture may soon find their way to this appreciative town from far Leasowe castle. — *Boston Herald.*

The Centenary of House-numbering. — Berlin is preparing to *fête* the hundredth birthday of the house number. In the London and Paris of a century ago ciphered houses did not exist. The coat-of-arms, the house-name, or the sign-board were the only indications to guide our ancestors' wandering feet by day or dark. "Watchman, what of the night, and where the deuce am I?" must often have been the cry of these bewildered minds. Berlin began to number houses in 1795. Starting from the Brandenburg Gate, the Prussian ediles counted straight on to infinity, neither beginning afresh with fresh streets, nor numbering the houses by odds and evens. Vienna adopted the latter reform in 1803, and Paris followed in 1805. The ciphered house came 100 years ago; the ciphered citizen is surely coming. Already a postal society is being formed in Vienna to suppress all names and addresses, and to deliver letters by a system of private marks and identity tickets. Our familiar addresses will look 100 years hence like the beginning of an algebraical problem, and our personality will be reduced — like the Government majority — to a mere expression of naughts and crosses. — *The Churchman.*

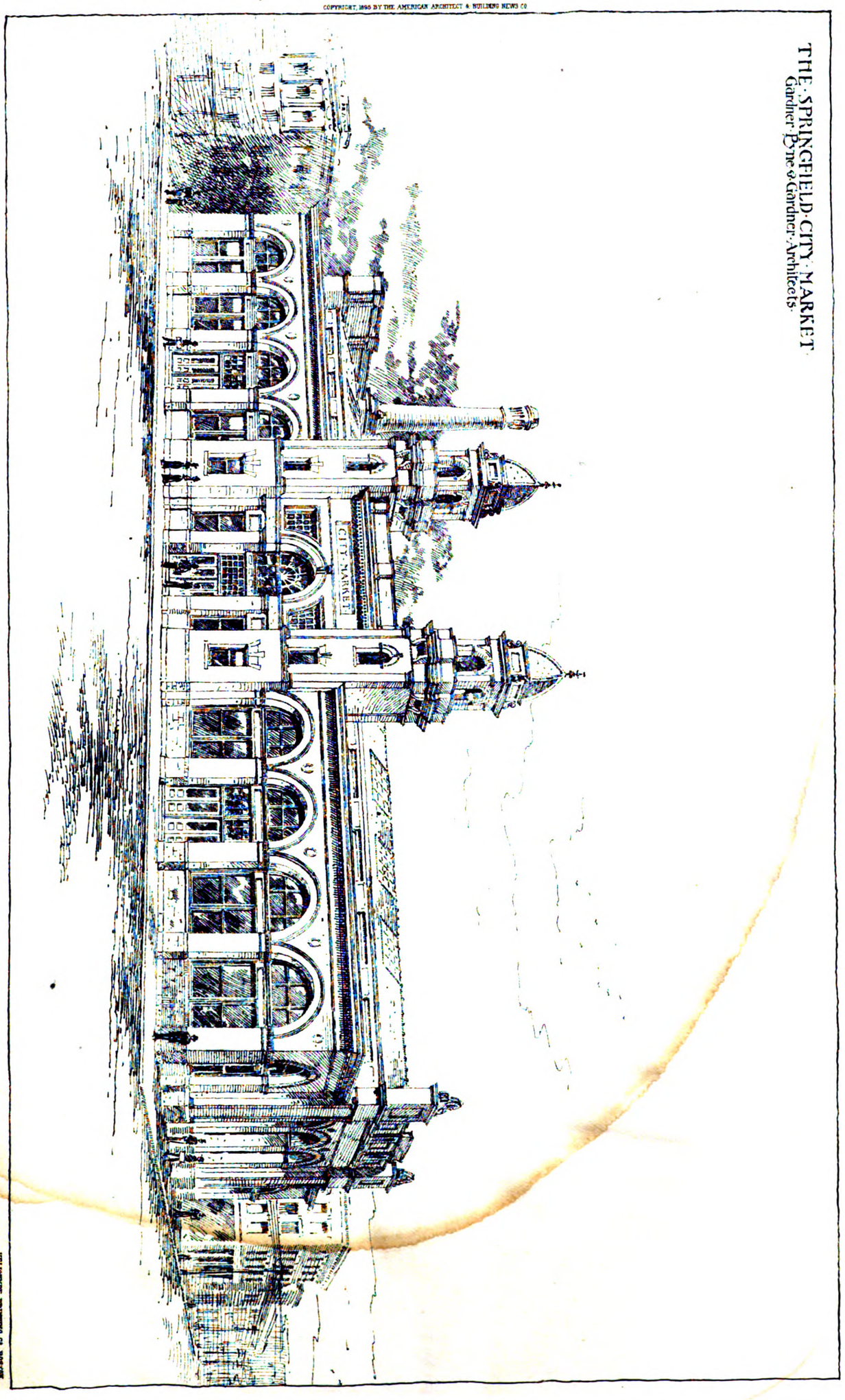
Glastonbury Abbey. — It is stated that the Duke of Norfolk is in treaty for the purchase of the ruins of Glastonbury Abbey, his intention being, if he succeeds, to restore it and present it to a Catholic order, says the London correspondent of the *Freeman's Journal* of Dublin. Glastonbury was once the most magnificent and richest abbey in the world. Its abbot had the power, received from Canute, the Dane, to refuse admission to enter its precincts to every person, even the king. Richard Whiting, the last abbot, was hanged in his robes for refusing to acknowledge the supremacy of Henry VIII., and the abbey was subsequently dismantled. It is now a picturesque mass of ivy-clad ruins, but sufficient remains to enable its departed glories to be vividly recalled. Almost every house in the adjacent town, which sprang up under the ægis of the abbey, is now either repaired or ornamented with carved stone from the ancient structure. The restoration of Glastonbury and the occupation of its hallowed cloisters by a Catholic order would mark an important era in the restoration of England to the faith.

Leicester and its Temple of Janus. — It may be interesting to old Shakspearean actors, as well as the lovers of Shakspeare, to learn, writes a correspondent of the *London Era*, that there exists at the present time in the town of Leicester a ruin of a temple dedicated to Janus. This ruin is known as the "Jewry Wall," and is in danger of being swept away to make way for the new railway station of the M. S. & L. Company in connection with their trunk-line to London. The owners of an adjoining factory have included this remarkable ruin in the sale of their property, although the vicar and church wardens of St. Nicholas, who claim the ruins as theirs, have protested. From accounts in my possession, it appears that King Lear founded the town or city of Leicester 884 years before the birth of our Saviour, and that he built therein a temple dedicated to Janus, and placed therein a Flamen (a pagan priest). It further appears that King Lear was buried in this temple by his daughter, Cordelia; also that another king of the Britons, named Archigalls, was buried there. As an action in the matter is pending, the vicar and church wardens would be glad of any assistance. Their object is not only to prove their right ownership, but also to preserve this important and interesting relic intact. Leicester has in the past lost too many historical relics, so that we ought to draw the line somewhere. Not far away stood the inn where Richard III slept on his way to Bosworth, also the Bow Bridge over which the king and his army passed. The theatre where Grimaldi performed has disappeared, but the room wherein Shakspeare read his plays still remains intact in the shape of the old town-hall. Gopsall Hall, too, where Handel spent some time, and where he wrote or prepared his great work, "The Messiah," remains intact. Leicester's former name was Learceaster.

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THE SPRINGFIELD CITY MARKET.
Gardner, Byrne & Gardner, Architects.

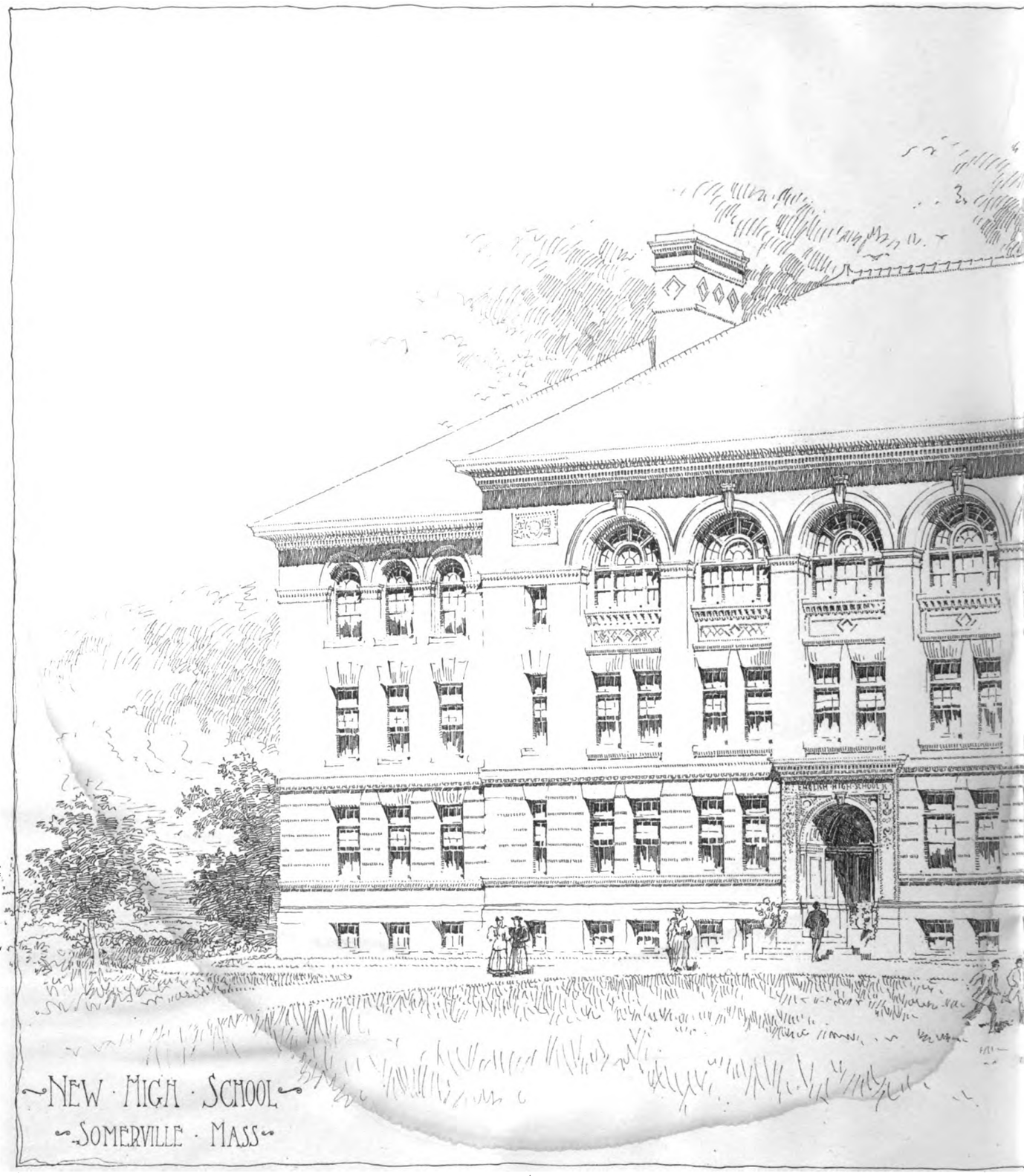
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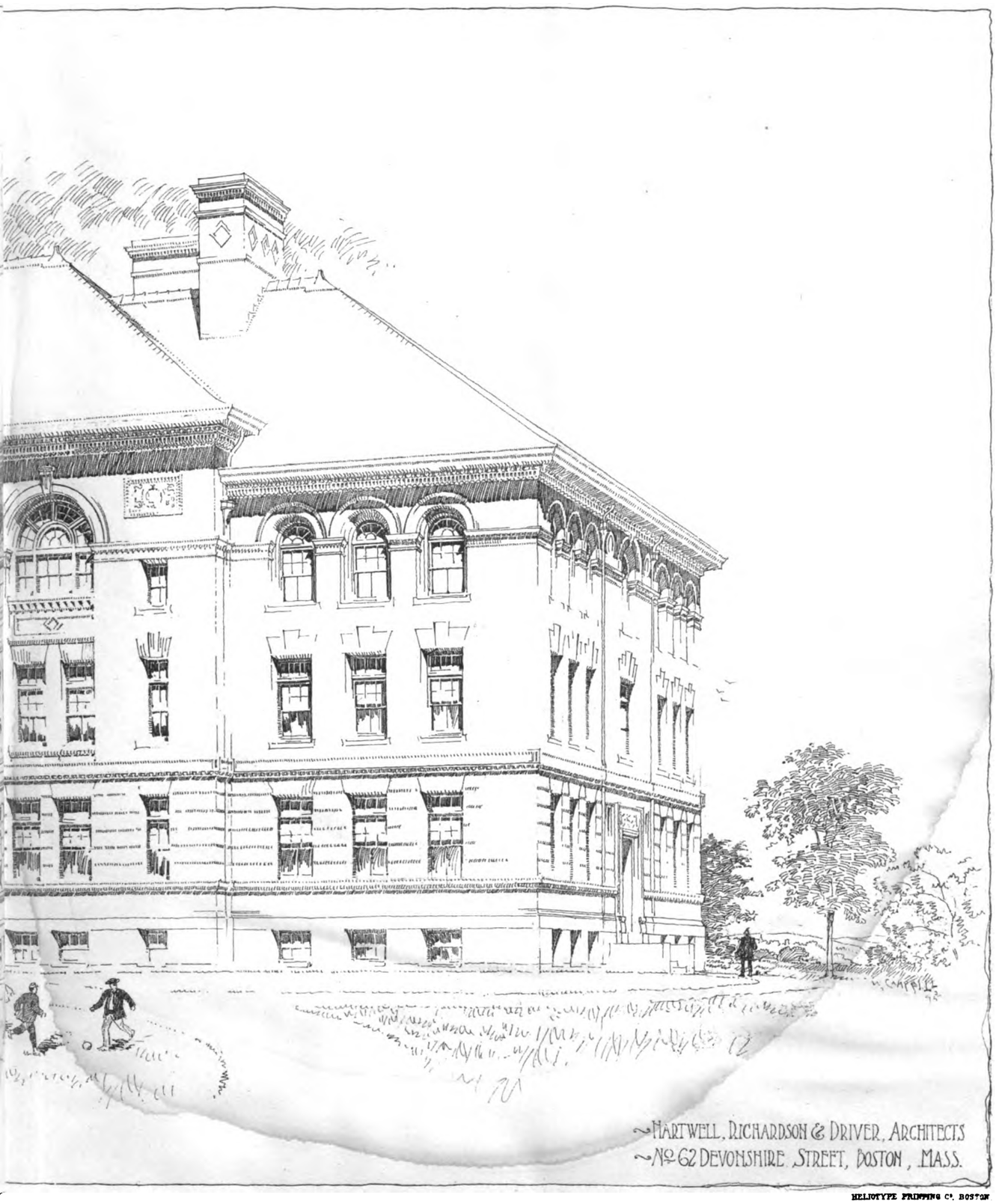
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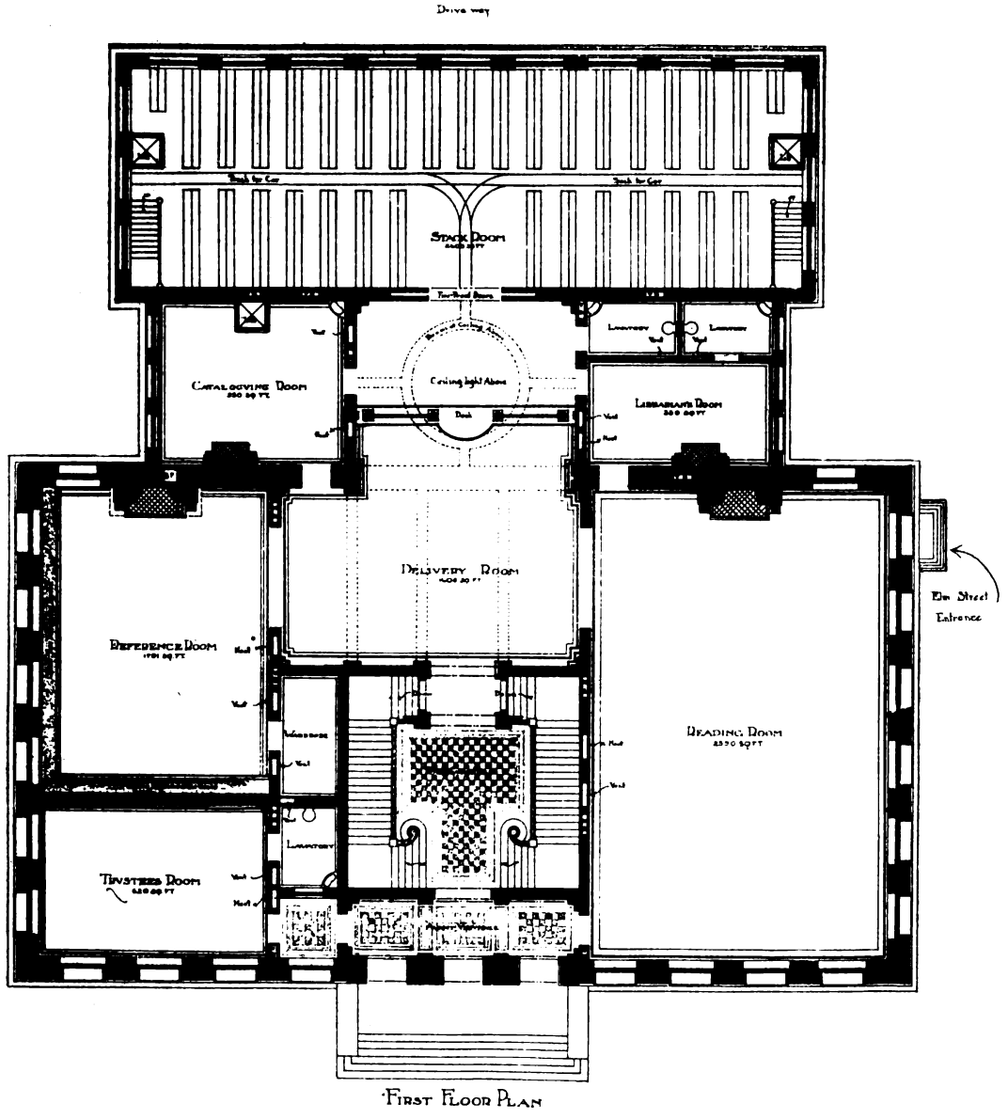
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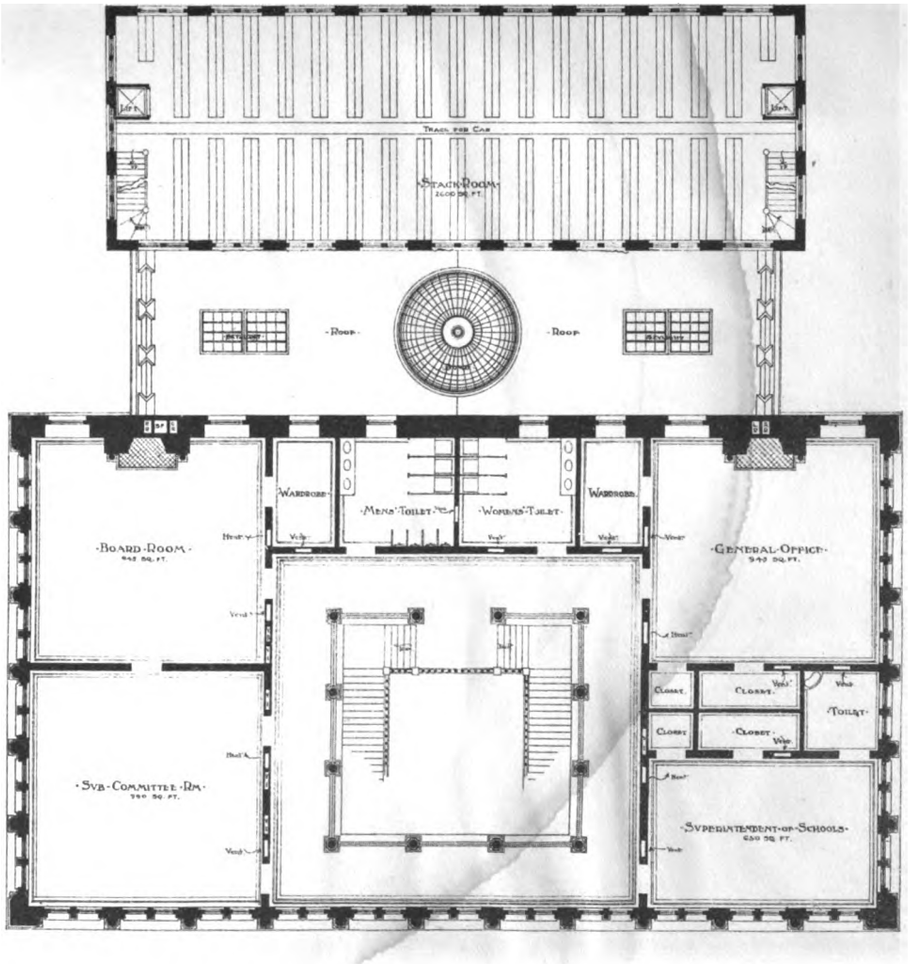
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First Floor Plan



Second Floor Plan

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE story of the arrest, trial and conviction of what is known as the East Side incendiary gang, in New York, reads like one of Gaboriau's romances. This gang, seven members of which are already in custody, is said to be composed entirely of Russian Jews, who had organized their work into a regular business, soliciting custom, settling accounts promptly, and investing profits, just like ordinary bankers or merchants. The most active member of the partnership appears to have been one Schoenholz, who set the fires himself, and did most of the drumming for custom. His plan, as shown by the evidence at his trial, was to get an introduction to some small shopkeeper or manufacturer, whose affairs were known not to be very prosperous, and, after securing his confidence, to unfold to him a scheme by which he could sell his entire stock in trade, including a large amount of fictitious goods, to the insurance companies, and set himself up in business again in another place, with a stock of new goods, and a good balance in cash. In order to secure these advantages, it was not necessary to implicate himself at all; the only thing needed was to come to an understanding that the insurance money should be shared with persons designated by Schoenholz, and then go to the theatre, or to the synagogue, or any other place out of the way, leaving the door of his store unlocked, or, at least, putting the key where Schoenholz could get it. The latter's proceedings, after all had been arranged, were equally simple. After the unfortunate shopkeeper was out of the way, his benefactor would make his appearance with a small bundle under his arm, containing a bladder, with a string attached to it, and filled with benzine and alcohol, a candle and a match. Suspending the bladder by the string to any convenient gas-fixture or other attachment, he would set the candle under it, light it, and depart at his leisure. In course of time, the benzine and alcohol, heated by the flame of the candle, would boil, and when the tension of their vapor rose to a sufficient height, the bladder would burst, scattering the liquid, which would catch fire instantly, over the room. Nothing more was required to set the place in a blaze; and, by the time the engines arrived, there was practically no salvage on the goods in the room. An insurance adjuster, who was alleged to be in the secret, certified to the amount of the loss, the insurance money was collected, and divided as had been agreed upon. It ought to be remarked, in Schoenholz's favor, that he seems to have worked with an intelligent understanding of the circumstances, and to have tried to arrange his fires in such a way that they should not spread beyond the room containing the goods insured to the dwelling-rooms above. One of the witnesses against him, who lived in rooms over a store which was set on fire by Schoenholz, testified that Schoenholz assured him that the fire would not spread to his rooms. As it happened, however, some of his things were burned, and he, as he testified, was angry, and reproached Schoenholz for his want of skill; but fire is notoriously an unruly instrument, and perhaps Schoenholz, by the risk to which he exposed innocent people, deserved the forty years' imprisonment to which he has been sentenced.

ONE of the curious things about the Schoenholz matter is that a large number of people seem to have known about the business that he carried on, but no one seems to have cared to inform the authorities. There is no doubt that he was protected by money and influence. One of the members of the band who is now in custody is said to have made seventy-five thousand dollars out of the business, and others are believed to have used Schoenholz as a cat's-paw for collecting fortunes for themselves. It was commonly believed, as the testimony showed, among the poorer and more ignorant people acquainted with the circumstances, that any one who revealed the secrets of the band would be killed; but the swindlers do not seem to have really slaughtered any one in pursuance of their purposes.

UNDER a new law, all engineers in charge of power or heating plants in Massachusetts must be licensed, and, in order to be licensed, they must pass an examination, arranged by the State authorities. Although enacted last winter, the law only went into operation in August, and the examinations are now open to candidates, who, if the daily papers are to be believed, do not take much satisfaction in them. It will be remembered that the Supervising Architect of the Treasury Department once wanted some assistants, who, either under the civil-service laws, or some special provision, were to be selected by competitive examination. The examination was held, but, if we remember rightly, not one of the applicants could pass it, and it was necessary to fill the positions in another way. So with the Massachusetts engineers, as we are told. The examination is a long one, some fifty or sixty questions being proposed, to which written answers must be given; and it appears that the questions are mainly theoretical, involving principles which can be learned from books, but which working engineers have little occasion or opportunity for studying. The consequence is, as we are told, that the first-class licenses will go to youths fresh from the technical schools, who know all about heat-units and calorimeters, but would have considerable difficulty, on starting the engine under their care, in finding the valve for draining the water out of the cylinders, even if the propriety of this operation should occur to them; while the men who have handled engines intelligently and successfully for twenty or thirty years are, as we are informed, in danger of being deprived of their livelihood because they cannot solve a mathematical problem involving the solution of a quadratic equation. How much foundation there may be for these complaints, we cannot say, but it would certainly be a mistake to undervalue experience in such examinations. Of course, a man who has greased a locomotive successfully for twenty years might blow up a heating boiler at the first trial; but, on the other hand, algebraic formulas cannot teach the light hand and quick eye of a good mechanic; so that such examinations should be arranged to test both the theoretical knowledge and the practical intelligence of the candidate, and great skill on the part of the examiner is necessary for this.

ONE of our readers calls attention to a letter written by Mr. E. C. Shankland, engineer in the office of Messrs. D. H. Burnham & Co., of Chicago, to the *Engineering Record*, in regard to the pile foundation under the Fisher, or Winnebago Building, giving a plan of the piling, and an explanation of the theory on which it was designed. According to this explanation, Mr. Shankland's idea was to compress the clay by means of the piles, rather than to drive these to a hard stratum. It is found that in Chicago, as in many other places with clay subsoil, a comparatively hard stratum, from six to ten feet thick, is found about fourteen feet below the street grade, and that under this stratum the clay is soft again to a great depth. When a heavy building is placed on piles driven to the first hard stratum, this is found to sink under the

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weight, allowing the building to settle from six to twelve inches. The movement then ceases, and Mr. Shankland thinks that, when this occurs, the thickness of the firm stratum would be found, on investigation, to have been increased from six or eight feet to perhaps twenty-five, by the squeezing of the water out of the lower soft clay, and the addition of the compressed, and therefore hardened, clay to the original hard stratum. In his Fisher Building foundation, therefore, it occurred to him, instead of driving piles to the hard stratum, and depending on the weight of the building to harden the soft clay beneath, by squeezing the water out of it, to compress the soft clay in the first instance, by means of large clusters of piles, under the piers and columns, driven through the first hard stratum; so that the building erected on these piers and columns would have beneath it from the beginning masses of dense clay, similar to those which, if it stood on piles driven only to the first stratum, it would have only after settling enough to compress the lower clay.

THIS idea is a valuable one, although we are not quite clear as to the action of the piles driven in Mr. Shankland's way. It is the common notion of builders, in clayey districts, near water, that the hard stratum, a few feet in thickness, which is usually found not far from the surface, resting on an indefinite depth of soft clay, originally formed the bottom of a body of water, and that its superior hardness is due to the action of the water, which, overflowing a soft clay formation, compressed by its weight the clay with which it came in contact, in such a way as to make it harder and more compact than the original material beneath. Whether the action of the water was quite so simple as this, is doubtful, but it seems to be evidently the case that the only difference between the hard, or bearing stratum, and the soft clay below, is in the consistency, the former having been compacted in some way out of the latter; and the possibility of forming an artificial bearing-stratum, by compacting certain portions of the clay, at a suitable depth, by means of piles, has often been discussed. Our correspondent argues that a cluster of piles, instead of squeezing the water out of the soft clay under and around them, would, unless the mass of clay were confined by sheet-piling, simply displace it, leaving what remained as soft as before. Mr. Shankland says, that, in practice, the driving of the clusters of piles, which were from twenty-five to twenty-seven feet long, driven three feet from centres, raised the surface of the clay around them from six to ten inches; and our correspondent thinks that this shows that the clay was merely displaced, and not compressed. To a certain extent, this criticism is justified. It is, however, to be considered that the resistance to lateral movement of the soil, which is due to friction, and increases with the depth, and consequent weight upon the surrounding soil, acts as a sort of sheet-piling, the effectiveness of which varies from zero, in pure water, whose particles move with perfect freedom in all directions, to a very considerable amount in soils of ordinary consistency. With this resistance to act against, the driving of a mass of piles ten or twelve feet square may be presumed to result in compressing the clay underneath them to a very appreciable extent, bringing the subsoil to a condition approaching that which it assumes after settlement under the weight of a building resting upon the first hard stratum. Whether further settlement will take place in a structure supported by clay compressed in this manner is a different question. Unless the compression extends to the underlying rock, which is unlikely, it seems as if the soft clay under the artificially-compacted mass would gradually flow out, allowing the mass itself to soften into its original condition; but this is something that only experience can determine.

THE main building of the University of Virginia, erected from plans drawn by Thomas Jefferson, and the scene of much of his later work, was destroyed by fire a few days ago. The University buildings are situated in the village of Charlottesville, at some distance from any fire-department, and, the regular water-supply being inadequate for dealing with the flames, help had to be summoned from Staunton and Lynchburg; but, on the arrival of the engines, nothing could be done but to blow up the adjoining buildings, to prevent the spread of the fire. The work of the University will not be interrupted, but the place of the buildings destroyed must be filled as quickly as possible, and the alumni and the public will probably be asked to contribute money for that purpose.

AN ordinance has been passed in San Francisco, limiting the height of buildings to one hundred and thirty feet, where they front on streets one hundred feet or more in width, and to one hundred feet, where they front on streets less than one hundred feet wide, and requiring that all structures over eighty feet in height shall be of fireproof materials throughout. The San Francisco *Argonaut* wishes that the maximum height had been set at one hundred feet, instead of one hundred and thirty; but to Eastern people, accustomed to seeing buildings two hundred feet high, fronting on streets thirty or forty feet wide, a limitation of height to thirty per cent more than the width of the street does not seem severe, and in the business part of such a city as San Francisco will soon be, it is almost necessary to allow owners to build ten stories in height, to secure to them reasonable interest on the value of their land; and a hundred and thirty feet is not too much for ten stories.

TO accuse one's neighbor is a bad way of defending one's-self, but we think that the public interest will be promoted by an occasional effort on our part to oppose the fashionable theory that, if an accident happens to any one during building operations, some one must be found guilty of manslaughter. The fact is that the construction of a building is, especially in cities, where it is seldom possible to get sufficient room for stagings and false-works, a difficult and dangerous operation for all concerned. Everybody understands this, and the people who consent to take part in such operations do so, knowing that they incur personal risks which they would not incur in most other sorts of business. Of course, we would not wish to excuse contractors or foremen who allow the necessary hazard of building operations to be increased by carelessness or neglect; but it is also very undesirable to encourage building workmen in the idea that they need not take reasonable care for their own safety. Of late, the practice of building in the United States has been compared, very much to its disadvantage, with that usual in Germany; and we have taken occasion to mention some falls of new buildings in Germany, to show that the idea that German work is better done, or better inspected, is quite unfounded. We have now another example to add to the list, in the fall of the spire of a church in process of construction in Berlin, the very focus of strict building-laws and still stricter police supervision. In this case, no one was injured, but the smash was a very complete one.

M. EMILE TRÉLAT, at a recent meeting of the French Association for the Advancement of Science, over which he presided, delivered a very clever and interesting discourse on hygiene in general, presenting a picture of a village, Hygiæa, in which health and comfort reign, contrasted with a town, Noson, in which the average life is short, and is oppressed by ailments of all kinds. Although Noson, as he represents it, is a prosperous community, while Hygiæa is comparatively poor, the people of the latter enjoy the advantages of a sunny situation, on the southward slope of a gravelly hill, at the foot of which runs a river. The ocean is not more than two hundred miles away, and the sea-winds blow freely through the valley in which the river flows. The surrounding region is broken, with wooded hills and clear streams. The village itself is composed of one-story houses, with cellars under them, surrounded by gardens. The soil, being porous, does not produce very abundantly, but sunshine and careful cultivation make up for the want of natural fertility. The climate is favorably affected by the proximity of the sea, which, like a climatic fly-wheel, as M. Trélat calls it, tempers both heat and cold; and the unusual development of surface afforded by the broken character of the country gives, so to speak, increased storage capacity for the sunshine which is absorbed by the soil. The village is so high above the river as not to be affected by the mists of the valley, and drinking-water is obtained from the springs which flow from the forest above. Under these conditions, with pure air, pure water, a dry soil, plenty of sunshine and an equable climate, men can live as happily as physical conditions will enable them to do so, and as M. Trélat says, this is the ideal which modern sanitation keeps in view. All the world, it is true, cannot live in hygienic hamlets; but it is possible to do something every day to purify the air and water that we consume, and to drain the soil over which we live; and this work has already made good progress. The next thing will be, perhaps, to provide for increased sunshine in our great cities, and in this the advice of architects will be valuable, and will undoubtedly be sought.

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ART IN THE MODERN CHURCH.[1] — VI.

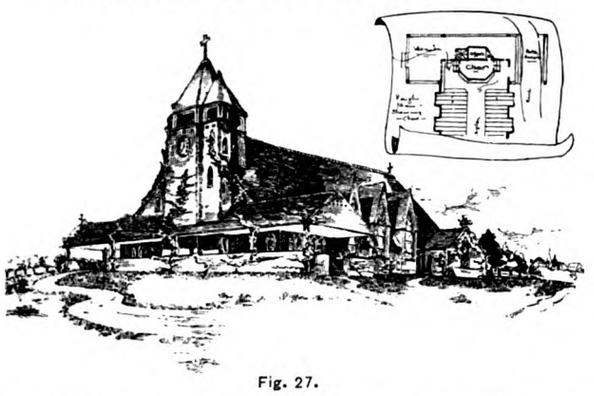


Fig. 27.

COUNTRY churches, in truth, would seem to lead the architect farther astray from the Christian ideal than any other sort. They have been inspired by the same element that has been so largely, and, in many cases, so delightfully developed in our house architecture. And it has, therefore, been presumed that the same quality is equally desirable, if not absolutely necessary, in the country church. A singular instance of this tendency, and the results at which it ends, is shown in Figure 27, which is a design for a country church.

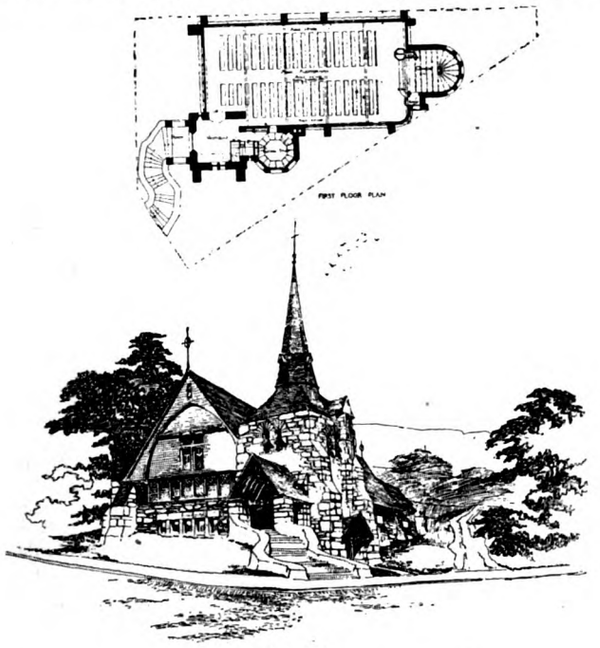


Fig. 28.

The end portion of this design, with the veranda and the tower, might better have served as the front of a casino or a club-house than a church dedicated to the Almighty. Perhaps the circumstance that this is the back of the church, and not the front of it, the choir being placed beneath the tower, has something to do with the producing of this effect. But, at any rate, we do not need on

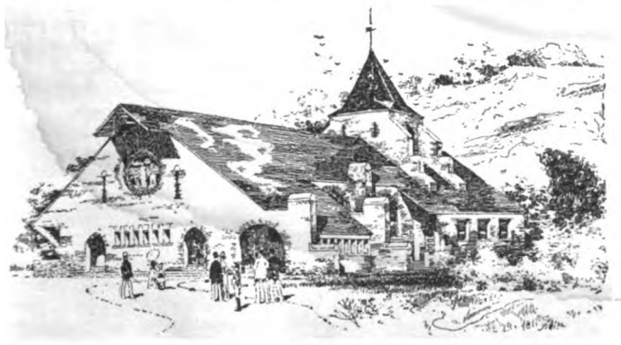


Fig. 29.

our churches large towers with open balconies beneath their roofs, where he and she may view the landscape with that unanimity that comes from dual solitude in youth!

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1037, page 66.

Nor can a vast veranda, with its suggestions of lounging-chairs and hammocks, of idle ladies and lazy men, seem a proper and holy adjunct to a church, even if spread across its rear, and looking out upon a landscape destitute of trees and beauty. These two strange features so entirely dominate this design, and both are so certainly



Fig. 30.

introduced because they produced a result of a certain picturesqueness, that nothing more need be said concerning it. Whatever faults as a design this may have, it was begun so far away from the true Christian spirit that it must be condemned at once. Neither godliness nor Christianity can be helped by such a structure as this.

Figure 28 is somewhat like a box of well-assorted confectionery. It contains a variety of mixtures, almost gay, and producing a result more complicated than any single one of them. It is an attractive little design, yet were it not for its spire, it would be hard to tell what manner of building it might be. It is, in brief, a picturesque design and a bad church.

Another design that may be studied in this connection is that of Figure 29. It is simple enough in idea, but the architects, while introducing no glaringly striking feature, and really keeping within sober limits, have, within the very simple range of their parts, introduced a good deal of variety for variety's sake. Here, as in many



Fig. 31.

other designs, a great deal of dependence is placed upon the roof for the church effect, though experience tells us no truer thing than that a roof may cover a multitude of sins.

In more pretentious designs the same rule holds, namely, that the picturesque should not be the leading *motif* in church architecture, and the more pretentious the design the more inexcusable the

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picturesque element. For in a large church it is always possible to introduce sobriety, dignity, spaciousness and beauty, all of which do much to produce a pure Christian effect. Architectural beauty, it need scarcely be said, is not the same quality as architectural picturesqueness, but when the latter becomes rampant, as it often

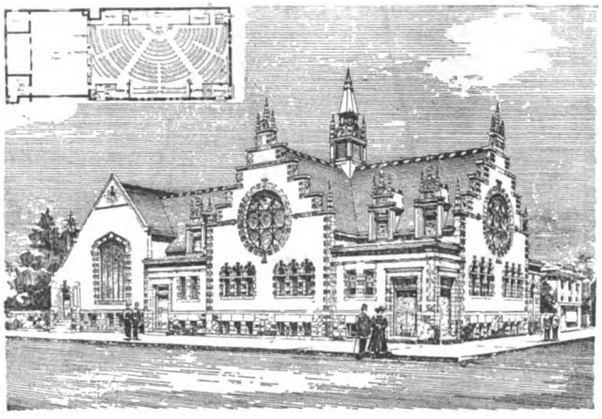


Fig. 32.

does, then beauty is retired, and a totally different character permeates the design. The picturesque, moreover, is more naturally a characteristic of small designs than of large ones, and a vast church, which is simply picturesque, is like some stately matron decked out with the furbelows and foolishness of extreme youth. The obnoxious element is, therefore, more obnoxious, if degrees of comparison are permissible, in a large design than in a small one, because so many of the elements of dignity and majesty, which help to make a Christian design, are deliberately ignored.

Some light is thrown on this point by a competitive design for a church (Fig. 30). There is a good deal that is excellent here, if such a modification of the Romanesque is a proper architectural language to be employed in a modern American church. Yet in its simplest form this design consists of a huge roof, supported by two gabled fronts, and surrounded with towers, turrets, dormers and pinnacles until the eye is bewildered by what the architect has so lavishly given us out of the abundance of his imagination. It should, however, be remembered, in studying this design, that it was destined for a non-liturgic worship. The central feature is a vast octagon that forms a not inappropriate auditory. But while this fact is expressed in the outline of the central mass, it is so surrounded by the lower parts, is so masked by fronts we naturally associate with liturgic churches, or with those in the traditional church form,



Fig. 33.

and the lecture-room in the back is so closely united with the main portions, that it is hard to tell just what sort of a building it may be. It does not, therefore, offer even so much as a non-liturgic effect.

We have not, heretofore, considered the relationship between the form of worship in a church and its expression in architecture. Considering the church solely from its fundamental standpoint as the house of God, the responsibility of the architect in expressing its specific destination beyond this has not been touched upon. But in the last design we have a structure that attempts to state that



Fig. 34.

the church is of the lecture-hall type; that the pulpit, not the altar, is the chief consideration. Why, then, it may be asked, is this fact masked behind an exterior that is neither the one nor the other? Why add parts, ornament, detail, enrichment of all sorts, to cover up the very thing it has been sought to build? If an auditory is desired, why not make one? Obviously the author of this design labored under a misapprehension of his duties. He planned a lecture-hall, of good form and convenient shape, and then surrounded it with parts that had no connection with his organic centre, because, in this way, he would obtain a picturesque attempt, which, doubtless, it was imagined, would have a traditional church effect. In other words, it was the picturesque that was sought, not a plain simple Christian expression of the uses to which the structure was to be put.

Much the same may be said of the design for the church in Figure 31, which, unlike the preceding design, has actually been built. Here the auditory has been more frankly expressed, there is less

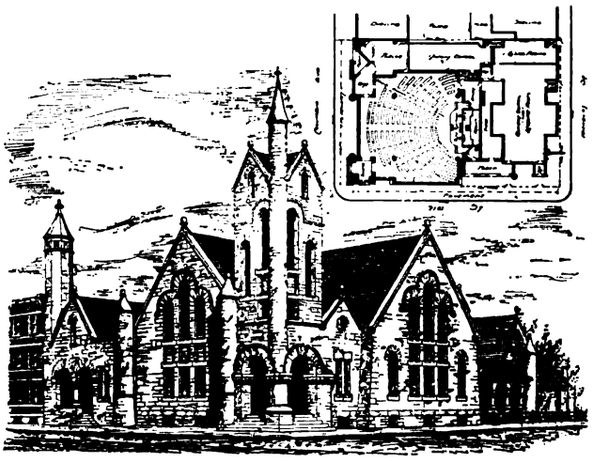


Fig. 35.

detail and fewer parts; the design is simpler, and yet, though the church auditorium may be regarded from certain standpoints as an entirely modern conception of a church building, the result is more strange and startling than churchly. The façade, with its two towers and connecting arcade, is simply a screen of traditionary

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character, in which the picturesque has been sought, instead of an expression of Christian faith.

And so we might go on, examining church after church, finding perhaps much of the picturesque in them, certainly some attempts to obtain it, but nothing at all of Christianity or of true Christian feeling in architecture. The fancy of the architect, his imagination, his memory, perhaps, is the leading determinative element in our church architecture, if it does not dominate it. In the subjoined figures (Figs. 32, 33, 34, 35 and 36) are shown a series of churches, chosen almost at random from a very large number of examples, and representing churches of various grades of cost and pretentiousness, as well as those belonging to a considerable variety of religious bodies. It is not pretended that as designs, as mere architectural compositions, these churches have equal merit, nor, indeed, that they contain any merit of this sort. But they illustrate, in a very fair manner, just the sort of buildings our people are satisfied with in their churches.

Viewed from this standpoint, the lesson they teach is impressive in its dismalness. These buildings have naught to tell us of the heavenly life, scarce hint at the existence of God, certainly tell us no story of Christian love and reverence, and faith and fortitude. They are studies in brick and stone, in mortar and plaster; they are exercises in architectural composition, in the grouping of roofs, windows, towers and doors; they are essays in economy, in the arrangement of materials, in ambitious attempts with limited means; a few of them illustrate more or less novelty in departing from the model we call the accepted one. But this is all. Nor are they types of a small group. Church after church, in city after city, and from one State to another, tell the same lesson, teach the same forgetfulness of religion as expressed in architecture. Yet so far are we, as a people, from appreciating the true value of church architecture, that just such designs as these might be grouped together,

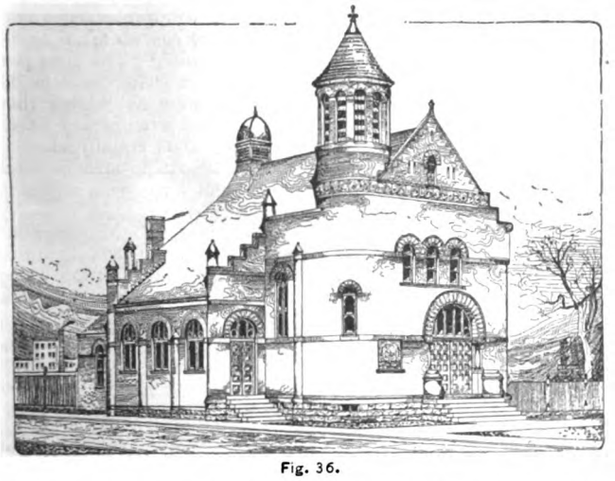


Fig. 36.

and learnedly discussed in an essay on church architecture. Types of architecture they may be, if you will, but types of church architecture, of religious architecture, of Christian architecture, they never have been, nor can they be, in such ungodly form.

BARR FERREE.

(To be continued.)

PROTECTION FROM LIGHTNING.[1]

AT the Aberdeen meeting of the British Association for the Advancement of Science Sir William Thomson made the remark, "If I urge Glasgow manufacturers to put up lightning-rods they say it is cheaper to insure than to do so."

This was the answer given by practical business men, concerned only with questions of profit and loss, to the foremost physicist of our time; and their answer will serve as fairly representing views widely held, founded upon the double belief that the risk from lightning is not so very great and the protection afforded by the present methods not sufficiently certain to warrant implicit confidence and justify the necessary expense.

The recent remarkable experiments of Dr. Oliver Lodge, in his lectures before the Society of Arts, opposing and to some degree directly contradicting the empirical rules of the Lightning-rod Conference, have given support to the belief that the protection was uncertain. Indeed, realizing that his work might be misinterpreted, Lodge has stated, "an idea at one time got abroad that my experiments proved existing lightning-conductors to be useless or dangerous; this is an entire misrepresentation. Almost any conductor is probably better than none, but few or no conductors are absolute and complete safeguards. Certain habits of lightning-rod practice may be improved and the curious freaks or vagaries of lightning strokes in protected buildings are intelligible without any blame attaching to the conductor; but this is very different from the contention that lightning-rods are unnecessary and useless. They are essential to anything like security."[2]

What Lodge's brilliant experimental work does show is that the momentum of an electric current can not be overlooked in a lightning discharge. The old "drain-pipe" idea of conveying electricity gently from cloud to earth must give place to the new proposition, based upon recent discoveries, that even draining off must be done in an appropriate way to be effective. To illustrate, the rocks and trees upon a mountain side may influence and determine the course of a mountain stream, but even a good-sized channel would not suffice to carry off safely an avalanche, or control the path of a landslide; so with lightning. In the past four years we have learned, through the work of Hertz and others, that when an electric current flows steadily in one direction in a cylindrical wire its intensity is the same in all parts of the wire; but if the current be of an oscillatory character, *i. e.*, a current which rapidly reverses its direction, the condition no longer holds, and if the alternations are very rapid the interior of the wire may be almost free from current. If lightning, then, be a discharge of an oscillatory character, it may happen that the current down the lightning-rod would be only *skin* deep. The experiments of Tesla and Elihu Thomson with currents of great frequency of alternation and very high potentials open the door to systematic study of discharges such as the ordinary lightning-flash. In daily work currents of this type are coming more and more into prominence, and the time is not far distant when the lightning-flash will be studied as an electrical discharge of this character. Protection entirely adequate for such discharges will then be forthcoming. Indeed, the reasons why present methods occasionally fail are now understood, and the proper remedies apparent.

And first let us see whether it is cheaper to insure than to provide proper protection. Foreign countries, especially Germany, France and Great Britain, have recognized the importance of obtaining reliable data concerning the loss of life and damage to property through lightning. Perhaps the work of the Royal Prussian Bureau of Statistics[3] gives the fullest and most detailed accounts of the damage done by lightning in Germany, and the relative injury. Statistics are available for the number of houses struck, the number of fires, the character of the roofing, soil, etc.

In 1891 the Weather Bureau issued to its observers instructions to report at the end of every month the names, with corroborative dates and places, of all persons killed by violent wind-storms, tornadoes and lightning. During 1890 somewhat similar statistics had been gathered, but the returns were less systematically arranged. In preparing the Weather Bureau lists, observers were directed to examine all daily papers published in their respective cities, consult all local authorities and make inquiry if necessary. Naturally, where dependence was had upon newspaper items, there resulted much duplication, but in verifying names and dates the duplicates quickly appear and exaggerated reports are easily confined to proper limits.

From the Weather Bureau records which have been tabulated, it appears that in the United States, for the four years, 1890-'93, 784 lives were lost, an average of 196 lives per year.

It is also evident that these lives were practically all lost in five months — April to September — and that in June and July the maximum death rate occurs.

The Weather Bureau records, unfortunately, do not give information as to the extent of damage to property. To get at something like a fair commercial estimate of the destruction of property by lightning, I have made use of the "*Chronicle* Fire-Tables" for the eight years 1885-'92. It is hardly necessary to remark that these tables are compiled from the reports of the fire-departments, insurance companies and the reports of fires in the public press, and represent a high degree of accuracy.

From information contained in these volumes, the following tables have been compiled:

FIRES CAUSED BY LIGHTNING.

Year.	Number of fires.	Loss on original risk.
1885 to 1890, inclusive	2,220	$8,386,826
1891	457	1,355,525
1892	839	2,921 484

Or, in eight years, ending 1892, in the United States, and for the most part east of the Rocky Mountains, 3,516 fires, with a loss of $12.663,835.

It is very evident, therefore, that the damage done by lightning is no inconsiderable matter to be lightly passed over or turned off by replies such as the one given by the Glasgow manufacturers. It is certainly worth while to erect the proper protective apparatus.

The following table shows the number of barns, stables, granaries, churches and dwellings set on fire by lightning during the years 1890, 1891 and 1892:

Year.	Barns, stables and granaries.	Churches.	Dwellings.
1890	363	29	121
1891	290	11	78
1892	495	29	177

During nine years, ending 1892, 2,335 barns, 104 churches and 664 dwellings have been struck by lightning.

The question has often been raised whether there exists a periodicity in the number of lightning-strokes. Statistics must cover a

[1] A circular of information prepared by Alexander McAdie and issued by the Weather Bureau of the United States Department of Agriculture.

[2] Page vi. "*Lightning-conductors and Lightning-guards.*"

[3] *Beitrage zur Statistick der Blitzschlage in Deutschland*; von Dr. Hellman, Berlin, 1886.

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period of, at least, twenty years before an answer to this question can be given, but it is interesting to compare the number and kind of buildings struck for the last two years of which we have record.

	1891.	1892.
Barns, granaries and stables	290	495
Churches	11	29
Country and general merchandise stores	5	6
Dwellings and tenements	78	177
Electric-light stations	1	2
Grain elevators	2	4
Grain fields	1	.....
Grain, hay and straw in stack	10	12
Ice-houses	4	4
Light-houses and life-saving stations (no other source of fire reported.)	2	.....
Livery-stables	4	4
Lumber-yards	2	1
Oil-refineries	2	2
Oil-tanks	2	22
Railroad depots	5	7
Telegraph and telephone offices	2	3

It is of particular interest to study the geographical distribution of the dwellings and barns struck in these two years. There are some notable increases in certain States, the reasons for which are not at present discernable. Attention is directed to the figures in bold-face type.

State.	Barns.		Dwellings.	
	1891.	1892.	1891.	1892.
Connecticut	9	**23**	6	**16**
Delaware	4	5	.....	.....
Illinois	17	7	7	**12**
Indiana	31	38	7	9
Iowa	19	6	.....	.....
Kansas	1	2	.....	.....
Kentucky	3	4	.....	.....
Maine	21	23	7	**16**
Maryland	12	8	.....	**6**
Massachusetts	12	15	8	**12**
Michigan	26	**70**	.....	**13**
Minnesota	7	5	4	6
Mississippi	1	.....	.....	.....
Missouri	2	1	2	3
Nebraska	1	.....	.....	.....
North Carolina	2	3	.....	2
New Hampshire	2	2	.....	.....
New Jersey	14	**30**	3	7
New York	30	**117**	5	**23**
Ohio	26	26	6	4
Oregon	2	.....	.....	.....
Pennsylvania	29	**73**	3	**23**
Rhode Island	1	4	.....	2
South Carolina	3	.....	.....	.....
South Dakota	3	3	.....	.....
Texas	4	7	.....	.....
Virginia	4	.....	.....	2
Wisconsin	6	**11**	2	3

According to the statistics of the German Bureau, previously referred to, the frequency of lightning-stroke varies somewhat with the character of the land. Thus, in their investigations it was found that in flat lands 400 to 540 buildings were struck out of 1,000,000, the rate varying in different localities.

The nature of the material used for roofing has also been considered. Classifying the various materials under the general heads "hard" and "soft," the German investigators found for ten years (1873-'83) for Schleswig-Holstein, that of all the buildings struck, 9 per cent of those having *hard* roofs and 68 per cent of those having *soft* roofs were set on fire. The nature of the building and the purpose for which it is used will, as we readily see also in our own statistics, influence the liability to stroke and fire.

One interesting point which appears to be shown by statistical studies of lightning-stroke is the decreased liability to accident in *thickly settled* communities.

It may be said, in general, that the risk in the country is five times greater than in the city. For ordinary dwelling-houses, not unduly exposed in city blocks, lightning-rods are hardly necessary, a very considerable protection being afforded by the tin roofing, numerous cornices, gutters, etc. The geological, as well as the topographical conditions, may have some influence upon the frequency of lightning stroke. According to the authority already quoted, if 1 represents the frequency of lightning stroke in a chalk formation, 2 will represent the liability for marl, 7 for clay, 9 for sand and 22 for loam.

With regard to trees, the oak is most frequently, and the beech least frequently, struck. The values are something like, if 1 represents the frequency for the beech-tree, 15 for pines, other trees generally averaged at 40 and 54 for oaks. Trees struck are most generally those standing in the clear or on the edge of forests, and in height averaging from 16 to 20 metres (52 to 66 feet). The trunk appears to be struck about three times as often as the boughs, and generally the stroke seems to travel to the ground. Only in three out of a hundred cases did it jump to other trees.

Mr. Symons,[1] in his paper on thunder-storms, instances 16 trees struck. About one-third of these were elms, with the oak, ash, poplar, in order following, and one case each of crab-lime and willow.

It is interesting to recall at this point the record made by Hugh Maxwell as early as 1787, that the elm, chestnut, oak and pine were often struck, the ash rarely, and the beech, birch and maple never. This last, however, is not true. Indeed, it is not altogether plain just why some trees escape while others suffer. Capt. Maclear,[2] discussing the action of lightning during a thunder-storm on June 6 and 7, 1889, found a great number of trees struck within a radius of four miles, and set to work to discover, if possible, the cause of the selection of these particular trees. "For contrary to general expectations," he says "they were not the highest nor the most prominent in their immediate vicinity." A cottage, a haystack, two poplars, a spruce, fir and five oaks, in different places, were struck within this confined area.

The storm passed in a northwest direction with southeast wind, and it is apparent that the objects struck lie nearly in a line northwest and southeast, three miles in length. The spruce was very prominent on the southern brow of the hill, with two arms nearly in line with the stem; one arm was thrown to the ground and the other blown down. At the juncture of the arms there was a great deal of turpentine which was thoroughly "blackened." Hence, it is assumed that the prominence of the tree made it the best communication to earth, and that the collection of turpentine was raised to explosive temperature and split the tree, but a like good reason does not appear for the other objects struck. On the next day six oaks, a chestnut and an ash, in various positions within one-half mile of a pond, and on the slope of ground near the pond, a young fir and three young oaks; one-half mile south of Cranleigh, four oaks; on Cranleigh Common an oak, and one mile northwest, a chimney, a stable and an oak (struck also on the day before) and a single oak occupying a fairly prominent position on the slope of high hills, two and one-half miles northeast.

This last tree was struck just before the rain commenced and was split; the other trees struck during the rain were only scored. "Hence," concludes Maclear, "it is not easy to see the cause of selection, for these trees were not the most prominent, nor were they on the highest ground in the vicinity, *the only feature the groups possessed in common being that they were all either near ditches which were full of running water, or else near temporary courses taken by the deluge of water from the higher to the lower ground.*[3] The most puzzling case is that of the young fir-tree and three young oaks in the middle of the copse near the pond. They were not higher than other trees on the copse, but there certainly was a temporary watercourse close to them; other trees, however, stood equally close to water. . . . Another curious case is that of the stable struck, which was overshadowed by tall elms, where it might have been supposed that these would have taken the stroke."

Some statistics of the damage done by lightning stroke in Belgium[4] in 1889 may be appropriately inserted here: Of 324 lightning flashes, 2 struck lightning-rods; 123 struck buildings, setting 36 on fire; 16 struck persons; 96, trees; 81, telegraph and telephone lines; and others, miscellaneous. In other statistics we find that of eighteen deaths due to lightning, one occurred within a dwelling, eleven out of doors and six under trees. Contrasted with the cases of death resulting from lightning stroke, let us look at forty-three cases of persons struck, with results not necessarily fatal, and we find that twenty of these were indoors, twenty-three out of doors, including four under trees. No records sufficiently extended and authentic are available to ascertain what proportion of persons struck by lightning are killed outright. I know of but one record, and in that out of two hundred and twelve persons struck, seventy-four were killed. This question, which is of the greatest interest, is referred to again under the last of the rules given farther on for the protection of life.

One of the peculiar and most common characteristics of the action of lightning is the *tearing off* or *throwing* effect. This, as we shall see farther on, is just what might be expected from discharges of great frequency of alternation. Some interesting statistics are given by Parnell[5] on the mechanical tearing off and disruptive effects of lightning as distinguished even from the *heat* effects. He records 1,147 cases. Of these, 224 do not permit a determination of the character of the work done by the stroke of the remaining 923.

	Mechanical work.	Heat.
Persons and animals	52	79
Cloths, carpets, canvas, woolen, linen and cotton goods	88	79
Masonry of all kinds	416	2
Glass, china, earthenware	82	5
Metal	206	173
Wood	254	98
Trees	63	4
Ground	60	.....
Thatch, straw, etc.	.....	11
Gunpowder	.....	15
Gas	.....	19
Total	1,221	485

Colonel Parnell gives, furthermore, the details in 278 cases to show the existence of an *upward* direction in the force of the stroke.

This, and the statement that "probably few persons are aware that lightning strokes are more apt to bend or break metal than to fuse it," are, in the light of the investigations of the past three years into the character of the lightning-flash, easily comprehensible. A lightning-flash being a break in the air (*i. e.*, the dielectric) when the

[1] Also Appendix E. "*Report of Lightning-rod Conference.*"

[2] *Quart. Journ. Met. Soc.*, 1890, p. 229.

[3] Italics mine.

[4] Evrard and Lambotte. *Ciel et Terre*, 1891; No. 7.

[5] *Quart. Journ. Met. Soc.*, vol. vi, 1895. See also Colonel Parnell's book.

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electrical strain exceeds a certain value, determined by several variables, the strongest mechanical effect may be found in any direction, upward or downward. Speaking popularly, flashes may go from cloud to earth, earth to cloud, or from cloud to cloud to earth.

II.

Beyond doubt, Franklin proved his case that lightning-rods were efficacious in the protection of buildings. Buildings with conductors when struck by lightning suffered little damage compared with those without protectors.

The chief defects likely to occur are blunted points and breaks in the continuity of the connection. The function of a lightning-rod is twofold; first, that of conducting the charge to earth, and second, the prevention of a disruptive discharge by silent neutralization of the cloud electrification. The latter explains why a rod terminates in a point and likewise why points in good connection with the ground are always *desirable* upon buildings. Indeed, points are somewhat like small water-pipes connected with a large reservoir. If you have enough of them and a sufficient time you may drain the largest reservoir. Furthermore, when some sudden rise or flood occurs in the reservoir, these minute drains may be of service in keeping the height of the water down.

In the case of lightning the points are the small escape-pipes, the layer of air between cloud and earth the retaining-wall, and the cloud electrification — or charge — the overflowing and destructive element. A large conductor, be it rod or tape, on the other hand is more like a large main or water-way, which has its gate shut until the flood is imminent. Then the gate is suddenly opened and we try to compel the torrent to keep to the provided path. We trust in its ability to safely hold the flood. Generally it does. In perhaps nine cases out of ten, the lightning-conductor, if it be such a one as we will describe later, does carry the flash to earth; but there are cases where the discharges have been heavy and overflows have resulted. To carry the lightning-flash "the lightning-conductor should offer a line of discharge more nearly perfect and more accessible than any other offered by the materials or contents of the edifice we wish to protect." To prevent the discharge "the conductor should be surrounded by points." These quotations are from the Report of the Lightning-rod Conference.

The statement that lightning always follows the path of least resistance, as commonly understood and stated, needs modification. True it is, that when the air is strained by being subjected to the electrifications of cloud and earth, the weakest spot gives away first, and this is apt to be in line with some small elevated knob or surface; but it is equally true, and is perhaps the more general case, that when a really vigorous disruptive discharge does occur, it is somewhat, as Dr. Lodge aptly puts it, like an "avalanche." As a matter of fact, we find from the study of actual cases, where buildings have been struck, that lightning often disregards entirely metallic surfaces and points. What we should first know is, whether the condition is to be one of "steady strain,"[1] or "impulsive rush"[1] discharge. In the case of "steady strain," the metal is apt to influence the path of discharge; in the case of an "impulsive rush" discharge, even *points* seem to lose their efficiency and become of little use.

In a letter[2] of an old British admiral there occurs a description of his being called upon to approve some specifications for a lightning-conductor to be erected on a certain lighthouse. He was himself a believer in the "surface" theory of Harris; but thought that, to make sure, he would go and consult his friend Faraday. Faraday, who saw only the question of conductivity in the problem, said very positively that the solid rod was better than the tube (which gives greater surface with less copper), and that *solid volume was everything*, superficial area nothing. Moreover, if Harris says otherwise, "then, he knows nothing whatever about it." The admiral straightway approved the solid-rod conductor for the lighthouse. Within two or three days he met Harris, and bringing up the question was told by Harris "*surface* area is most important, and if Faraday says otherwise, then he knows nothing whatever about it!"

Up to a certain point Faraday was right; a copper rod an inch thick is capable of carrying almost any flash of lightning, and is undoubtedly a great protector, but if, as we have reason to believe, the core is seldom given a chance to carry the current, why have it? The views of Sir W. Snow Harris, based as they were upon close study of many thousand cases of lightning action, are finding in the experiments of to-day the confirmation so long needed.

While not going into details regarding this question of the shape of the rod, let us emphasize the fact, so recently brought out, that if an electric current flows steadily in one direction in a cylindrical wire, its intensity is the same in all portions of the wire, as shown by Hertz, but that with a current of an oscillatory character, *i. e.*, a current which rapidly reverses its direction, this condition no longer holds, and if the direction is altered very rapidly the interior of the wire, in our case the lightning-rod, may be almost free from current.

In 1882 appeared the report of the Lightning-rod Conference; in many respects the most important contribution to the literature of the subject yet made. While so many foreign governments, and in particular France, had by means of officially constituted boards taken a governmental interest in the protection of the people from the dangers of lightning, the English-speaking people of the world aside from the few directions officially issued for the protection of magazines and lighthouses, remained without any authoritative utterance upon the subject; and while this conference itself did not have strictly official sanction, it carries, from the character of its make-up, a weight certainly as great, if not greater, than an official board. It was simply a joint committee of representative members of the Institute of British Architects, the Physical Society, the Society of Telegraph Engineers and Electricians, the Meteorological Society, and two coöpted members. As might be anticipated from such auspices, the report is an excellent one, and must stand for years as the embodiment of the most widely-gathered information and well-considered decisions. The report is emphatically one based upon *experience*.

The famous free-for-all discussion which occurred at the British Association Meeting in 1888, so far as our judgment goes, simply proved that the decisions of the conference could not at present be disregarded. As the president of the meeting, Sir William Thomson said, "we have very strong reason to feel that there is a very comfortable degree of security, if not of absolute safety, given to us by lightning-conductors made according to the present and orthodox rules."

There are one or two further features to which attention may be called. There are some very prevalent misapprehensions with regard to lightning. For example: that it never strikes twice in the same place; that the most exposed place is always struck; that a few inches of glass or a few feet of air will serve as a competent insulator to bar the progress of a flash that has forced its way through a thousand feet of air, etc. These are alluded to in the following general directions:

III.

1. *Erection of rods.*— Few questions have been so thoroughly discussed from practical as well as theoretical standpoints as that of the certainty of the protection afforded by properly constructed lightning-rods. All barns and exposed buildings should have lightning-rods. Ordinary dwelling-houses in city blocks have not the need for rods that scattered houses in the country, and especially if on hillsides, have.

2. Use a good iron or copper conductor. If the latter, one weighing about 6 ounces to the foot, and preferably in the form of tape. If iron is used and it seems to be in every way as efficient as copper, have it in rod or tape form and weighing about 35 ounces to the foot. "A sheet of copper constitutes a conductive path for the discharge from a lightning-stroke much less impeded by self-induction than the same quantity of copper in a more condensed form, whether tabular or solid." [Sir William Thomson.]

3. The nature of the locality (See Chapter I) will determine to a great degree the need of a rod. Places apart but a few miles will differ greatly in the relative frequency of flashes. In some localities the erection of a rod is imperative; in others, hardly necessary.

4. The very best ground you can get is, after all, for some flashes but a very poor one; therefore, do not imagine that you can overdo the matter in the making of a good ground. For a great many flashes an ordinary ground suffices, but the small resistance of $\frac{1}{10}$ ohm for an intense oscillatory flash may be dangerous. Bury the earth-plates in damp earth or running water.

5. "If the conductor at any part of the course goes near water or gas mains, it is best to connect it to them. Wherever one metal ramification approaches another, it is best to connect them metallically. The neighborhood of small-bore fusible gas-pipes and indoor gas-pipes in general should be avoided." [Lodge.]

6. The top of the rod should be plated or in some way protected from corrosion and rest.

7. Independent grounds are preferable to water and gas mains.

8. Clusters of points or groups of two or three along the ridge rod are recommended.

9. Chain or link conductors are of little use.

10. *Area of protection.*— Very little faith is to be placed in the so-called "area of protection." The committee that first gave authority to this belief considered that the area protected by any one rod was one with a radius equal to twice the height of the conductor from the ground. Many lightning-rod manufacturers consider that the rod protects an area of radius equal to the height. The truth is that buildings are struck sometimes within this very area, and we now hold there is no such thing as a definite protected area.

11. *Return shock.*— Some uncertainty exists on this point. The so-called "return stroke" is caused by the inductive action of the charged cloud on bodies within its influence, and yet some distance away from the place of the direct discharge. As explained by Lord Mahon, who first called attention thereto, the sudden return of the body charged inductively to a neutral condition, following the equalization at some distant place, is the cause of the return shock. We are beginning, however, to see more clearly into the character of the stress in the dielectric, preceding and during flashes, and it is only a question of time before the use of this term, "return shock," will be abandoned. Of far greater import are the terms "recoil kick" and "alternative path," as shown experimentally by Lodge to exist.

12. *Upward motion of stroke.*— There is no reason to doubt that the discharge takes place sometimes from earth to cloud. That is to say, that while we now consider a lightning-flash as something like the discharge of a condenser through its own dielectric, made up of excessively frequent alternations, say something like 300,000 times per

[1] Terms used by Professor Lodge.
[2] See Report of Lightning-rod Conference.

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second, the spark, or core of incandescent air, may seem to have had its beginning at the earth's surface. That is to say, the air gap breaks down first at a point near the earth.

13. *Indifference of lightning to the path of least resistance.*—Nearly all treatises upon lightning up to within very recent times, assumed that lightning always followed the path of least resistance. "It is simply hopeless to pretend to be able," says Lodge, "to make the lightning-conductor so much the easier path that all others are out of the question." The path will depend largely upon the character of the flash.

14. Any part of a building, if the flash be of a certain character, may be struck, whether there is a rod on the building or not. Fortunately, these are exceptional instances. The great majority of flashes in our latitudes are not so intense but that a good lightning-rod, well earthed, makes the most natural path for the flash. We have many instances, however (not to be confounded with cases of defective rods), where edifices, seemingly well protected, have been struck below the rods.

15. Parodox of parodoxes, a building may be seriously damaged by lightning *without having been struck at all.* Take the famous Hotel de Ville of Brussels. This building was so well protected that scientific men pronounced it the best protected building in the world against lightning. Yet is was damaged by fire caused by a small induced spark near escaping gas. During the thunderstorm, some one flash started "surgings" in a piece of metal not connected in any way with the protective train of metal. The building probably did not receive even a side flash. This is, therefore, a new source of danger from within, and but emphasizes the necessity of connecting metal with the rod system.

16. Lightning does sometimes strike twice in the same place. Whoever studies the effects of lightning's action, especially severe cases, is almost tempted to remark that there is often but little left for the lightning to strike again. No good reason is known why a place that has once been struck may not be struck again. There are many cases on record supporting the assertion.

17. As lightning often falls indiscriminately upon tree, rock or building, it will make but little difference sometimes whether trees are higher than adjoining buildings.

18. It is not judicious to stand under trees during thunderstorms, in the doorway of barns, close to cattle, or near chimneys and fireplaces. On the other hand, there is not much sense in going to bed or trying to insulate one's self in feather beds. Small articles of steel, also, do not have the power to *attract* lightning, as it is popularly put, to determine the path of discharge.

19. *Unnecessary alarm.*—Just in advance of thunderstorms, whether because of the varying electrical potential of the air, or of the changing conditions of temperature, humidity and pressure, and failure of the nervous organization to respond quickly, or to whatever cause it may be due, it cannot be denied that there is much suffering from depression, etc., at these times. It is, perhaps, possible that these sufferings may be alleviated. Apart from this, many people suffer greatly from *alarm* during the prevalence of thunderstorms, somewhat unnecessarily, we think. Grant even that the lightning is going to strike close in your vicinity. There are many flashes that are of less intensity than we imagine, discharges that the human body could withstand without permanent serious effects. Voltaire's caustic witticism, "that there are some great lords which it does not do to approach too closely, and lightning is one of these," needs a little revision in these days of high potential oscillatory currents. Indeed, the other saying, "Heaven has more thunders to alarm than thunderbolts to punish," has just so much more point to it, as it is nearer the truth. *One who lives to see the lightning flash* need not concern himself much about the possibility of personal injury from that flash.

20. Finally, if you should be in the vicinity of a person who has just been struck by lightning, no matter if the person struck appears to be dead, go to work at once and try to restore consciousness. There are many cases on record proving the wisdom of this course; and there is reason for believing that lightning often brings about suspended animation rather than somatic death. Try to stimulate the respiration and circulation. Do not cease in the effort to restore animation in less than one hour's time. For an excellent illustration of a case of severe lightning shock and recovery, due, it would seem, to prompt action by the medical gentlemen present, all who are interested may consult the *Medical News*, August 11, 1888. A number of cases corroborative of this view are on record in various medical journals.

IV.

A practical application of the efficiency of lightning-conductors will now be considered. On June 5, 1885, the Washington Monument, at Washington, D. C., at that time the highest edifice in the world, was struck by lightning. The barograph curve shows the fluctuation in pressure about the time of the occurrence of the stroke, 3.15 P. M. The storm itself was, as usual, a secondary depression in the southeastern or southern quadrant of a "low" area, and at Washington resulted in a high forenoon temperature, with a maximum of 90° Fahrenheit about noon, with fresh southerly winds, veering to southwest at noon; to northwest at 1.23 P. M.; to northeast at 1.40 P. M.; and backing to northwest at 1.42 P. M.; to east at 2.20 P. M.; to northwest at 2.37 P. M., and veering to northeast at 2.40 P. M., from whence it shifted to southwest at 3.02 P. M.; to northwest at 3.10 P. M., and at 7 P. M. was blowing steadily from the north. The first thunder was heard at 1.07 P. M., and rain began at 1.23 P. M., ceasing at 2 P. M., commencing again at 2.20 P. M., and ending at 3.05 P. M. Thunder continued at frequent intervals at 3.50 P. M. The rain was at times heavy, and hail fell in the northern part of the city. Amount of rainfall at Signal Office, 0.61 inch.

Col. Casey, U. S. Army, the engineer in charge of the construction of the monument, requested Profs. Rowland, Newcomb and Mendenhall to examine the part struck and suggest what precautions should be taken to ensure the safety of the monument. It is proper to remark that the monument had been for all practical purposes finished and had already experienced storms of seemingly greater violence.

From the letter[1] of the commissioners charged with the completion of the monument, we find that "a considerable amount of unexpected work" was performed in the erection of rods and points to protect the obelisk from lightning. "The lightning protectors as established for the monument were commenced in January, 1880, and were finished in January, 1885," practically the date of completion of the monument. The elevation of the solid aluminium pyramid (which weighs 100 ounces and is 8.9 inches high and 5.6 inches square at base, with angle at the vertex of 34° 48′ is 555 feet (169.16 metres).

The conductors consist of the four hollow wrought-iron Phœnix columns, supporting the elevator machinery. "The bottoms of these four columns rest upon and are bolted to cast-iron shoes, standing upon the floor of the large drum pit, ... and the shoes are connected to ¾-inch soft copper rods, led to the bottom of a well in the centre of the foundation. This well is 32 feet 10 inches in depth below the bottom of the drum-pit and 15 feet 8 inches below the bottom of the masonry foundation, and the water stands in it permanently 2 feet 8 inches above its bottom. After the copper rods were inserted, the well was filled up with clean sharp sand for a depth of 15 feet 8 inches, or up to the level of the bottom of the old rubble-stone foundation of the monument. These four columns so arranged at their bases, *and always projecting above the top of the shaft, were continually lengthened as the building of the shaft progressed, and for the five summers during which the masonry was in progress acted as the lightning-conductors of the edifice.*[2] No disruptive discharge of electricity was experienced during those years." When the marble pyramidion was completed, December, 1884, these four columns were within this marble covering, and from the extremity of each column a copper rod ¾-inch in diameter was run to the top stone and there united in a copper rod 1½ inches in thickness, which passed vertically through the cap-stone and was screwed into the solid aluminium pyramid.

The conductors "when tested, gave an electrical resistance of .1 ohm from the tip of the terminal to the copper rods at the base, and 2.2 ohms for the ground connections, making a total resistance of 2.3 ohms for the conductor. The system was entirely completed and connected on January 20, 1885."

On April 5, 1885, during the passage of a heavy thundercloud over the monument, at least five immense sparks or bolts of electrical light were seen within a period of twenty minutes to flash between the terminals and the cloud without audible sound to the observers. A careful examination of the conductors and shaft after this phenomena failed to reveal any effects from these discharges.

On June 5, however, during the thunderstorm described above, a disruptive discharge was seen to pass between the summit of the pyramidion and the cloud. Upon examining the structure a crack was discovered in the stone in the north face of the pyramidion, just under the top stone, extending through the block in a line nearly parallel to the northeast corner and about 8½ inches from it. The fragment was pressed outward about ¾-inch at its bottom, chipping a small piece off the lower corner of the top stone into which it was locked, and was easily forced back to place and bolted to the solid stone from which it had been torn.

The recommendations of the gentlemen above named, who were asked to make a careful examination, were, in short, that the interior conductors should be connected "with a system of rods and a greater number of points, to be located upon the exterior of the pyramidion." Four one-half inch copper rods were fastened by a band to the aluminium terminal and led down the corners to the base of the pyramidion, and then through the masonry to the columns.

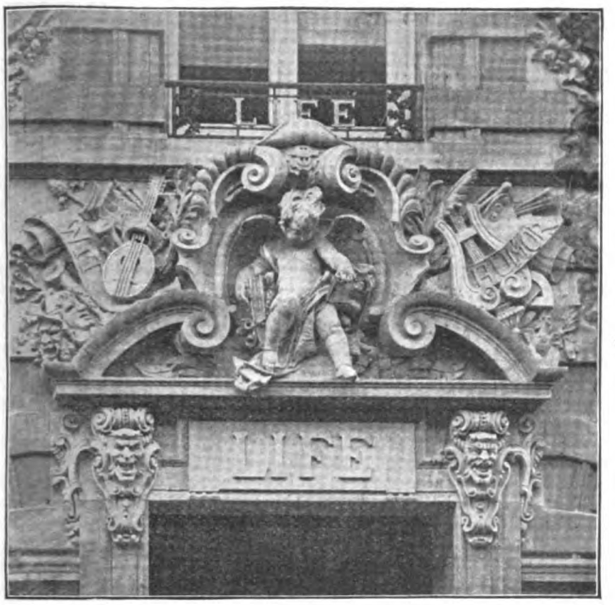
"As these exterior rods are each over sixty feet long, they are also connected at two intermediate points of their lengths with the iron columns by means of copper rods one-half and three-quarters inch in diameter, respectively, furnishing sixteen rods in all, connecting the exterior system of conductors with the interior conducting columns. Where the exterior rods upon the corners cross the eleven highest horizontal joints of the masonry of the pyramidion they are connected to each other all around by other copper rods sunk into those joints. All of these exterior rods, couplings and fittings are gold-plated, and are studded at every five feet of their lengths with copper points three inches in length, gold-plated and tipped with platinum. There are two hundred of these points in all."

Eight years have now passed since the alterations were made and the monument stands uninjured. Unquestionably, standing as it does, 555 feet high, in the centre of flat, well-watered ground, it constitutes a most dangerous *exposure* for lightning flashes. No better illustration of the value of lightning-conductors can be asked.

[1] Senate Ex. Doc. No. 6, 49th Congress, 1st Session.
[2] Italics mine.

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ST. PAUL AND ITS NEW STATE-HOUSE.



Door-head, *Life* Building, New York, N. Y. Carrere & Hastings, Architects.

YES, the public is really interested in architecture and is becoming more and more appreciative of it. Young men and old, and more particularly young women, know something about "the styles," something about the history of art and not a little about whether a building is good or not, and why it is so or is not so. At St. Louis, Professor Ives, the Director of the Museum of Art — who is doing some really good and interesting work in popularizing art and making the collections under his charge of real value to working people and artisans — declares he never has any but full houses when lectures on architecture — illustrated with stereopticon slides, of course — are to be given.

Up here in the Northwest, at St. Paul, popular interest has been manifested too, in rather an impressive way: the door-keeper says that while the competitive drawings for the new State-house were on exhibition, about twenty-five hundred visitors viewed the designs during a single day, while for the whole fortnight the drawings were open to the public the total tally ran to over twenty thousand. As this story was not verified by turn-stile count it needs to be taken with some allowance. But the fact remains that an unusually large number of laymen visited that generally supposed-to-be uninteresting thing, an exhibition of architectural drawings. Of course, this particular exhibition has been more attractive than architectural exhibitions ordinarily are. Not only has there been a prolonged and exciting struggle between St. Paul and Minneapolis as to whether the former should remain the capital city of the State and possess the new building as it has the old one, but there was much interest excited over, and much discussion in the newspapers evoked by, the first competition, which turned out such a fiasco.

However this second competition may result, it is evident that this exhibition of the drawings to the public, coming as it does between the making of the award by the expert adviser, Mr. E. M. Wheelwright, and the opening of his report by the Commissioners, is likely to be a benefit to the enterprise. It has given people a chance to compare the designs on their own account, to talk them over privately and in the public prints, and to realize that the local man with the "strong pull" has not beyond possibility of dispute presented the best solution.

What would be the result of a popular ballot I can't guess. Although I spent probably as much time in examining the drawings as any casual St. Paul layman did, I have not the least idea which design I should select as the best. I doubt if of the five I preferred more than two would be found in Mr. Wheelwright's list. One can but be bewildered by a short study of a number of designs, and if this is the case with one who understands drawings, how much more certain is the bewilderment in which laymen involve themselves when they sit down and try to exercise their untrained minds on such a problem. It is the usual result of competitions where an expert has not been employed that the award is made to a local architect, and this result is usually taken to be the result of collusion, bribery, "pull" and all kinds of unpleasant things.

For my own part, I incline to believe that the award is made to the local practitioner in sheer desperation. After a vain attempt to comprehend what the drawings really mean and how a section explains things which the plan cannot show, the committee-men begin to discuss and argue, and each finds he has understood the same things differently from his fellows and can neither convince them that they are wrong or be convinced by them that he is mistaken. Discussion makes the fog only thicker, till some brighter member says something like this: "Look here! we'd might as well agree that we don't understand these plaguy drawings and we may make the worst kind of a mistake if we go outside our own town. We all know the architects in this place and know what is their general reputation. Let's choose the man rather than the drawing." And so, *nem. con.*, the local designs are sorted out from the lot and the best of them — in the committee's judgment — is selected. It seems as if many a competition must be decided in this way, with a certain honesty of purpose, and without any underhandedness on the part of any one.

And the architects from other places, the outer barbarians, are they fairly treated? No, of course they are not; but did they deserve to be? In this particular competition the secretary of the Commissioners could not find words fitting to express his appreciation of the folly of architects in submitting to the "competition evil." If the beneficiaries of this evil system are willing to acknowledge the unfairness of it, what fools we all are to encourage its continuance by taking part in these scrambles which so often are decided in favor of home talent!

It is usually alleged that, however great the evils of the competition system may be, it has the advantage of giving a chance to men without social influence and to young and untried men. For this reason I looked with some care at the drawings to see what new men had been discovered. So far as my knowledge of names went, there were only three or four designs submitted by young architects who have just opened offices or by draughtsmen who styled themselves architects for this occasion only. Their work was distinctly that of beginners who had not yet got themselves out of the ruts of school training, but who showed distinctly that they had had training — good training, too. These designs formed a very acceptable transition between the designs of the men of some standing in the profession and the men who have standing only in their own communities. About half the designs were very unscholarly in their crudeness and I imagined that they must be the work of some of the elders of the profession who grew to be architects without the advantage of schooling or travel, men for whom and for whose efforts we all must have sincere respect — although we would much rather not have them take us to admire and criticise the buildings which they have erected.

It is to be hoped that St. Paul will eventually secure a state-house that is really a refined piece of design, for if it does not, then the new building will be quite at variance with the general character of the city itself. It is curious how distinctly different cities have an individual flavor that is perceptible to the traveller, quite as distinct in this new country as in Europe. In its more active and stirring way St. Paul impressed me with the same air of social refinement that still lingers about Portsmouth, N. H. Now, if the society in a place is refined, the chances are that the buildings in which its members house themselves will be refined also, and in this particular, at least, the buildings of St. Paul are unusually strong. It has been the good fortune of the city to have amongst its architects a few men of marked delicacy of feeling and as the town is not so very old the work of these men "tells" with great force, not by contrast, but as a leaven, for the public has not been slow to appreciate the value of such work and has sought to imitate the same spirit even when employing other designers.

St. Paul is not very old, hardly removed by more than seventy years from the condition of a primeval forest. It is this very youthfulness that makes a bit of Colonial architecture seem wholly out of place and a sheer anachronism when one comes upon a house cast in the prevailing fashion of the day, so far as wooden houses go. Colonists who imported workmen and material from the mother-country had nothing whatever to do with the founding of St. Paul, and a house that looks in place anywhere along the Atlantic seaboard seems singularly out of place in the Northwest. Other styles have no distinct habitat, but the Colonial work is fairly indigenous and though actually suitable to any part of the country looks in St. Paul a little as if it were taking part in a masquerade party.

Just what it is about St. Paul that makes it seem more like a New England city than any place I have seen in the West is hard to determine. The hills and the somewhat crooked streets, entailed by the contour of the ground, suggest Boston, and the houses along Summit Avenue suggest certain parts of Brookline or Longwood, but after all it is more the air and bearing of the people themselves and the slightness of the Western accent in their speech that smack most of New England. It is a place a Bostonian would feel at home in and like to live in, if he could forego Boston's life-saving east winds in the hot season. It does not give one the impression of breathless energy, push and hurry that overpowers one in Chicago, although there is nothing that suggests sloth or lack of energy. Its local atmosphere suggests that its inhabitants have made their money and are enjoying it, rather than that they are straining every nerve and muscle and devoting every instant to its acquirement. It appears to be a distinctly different atmosphere from that which involves the neighboring city of Minneapolis, a dozen miles higher up the river. Here people seem to be still "on the make" and but few of them have had time to stop and consider whether life may not offer other pleasures than those of mere money-getting.

It is, perhaps, unfair, after going about one of the "Twin Cities" under guidance and then wandering around its fellow without the aid of a *cicerone*, to institute comparisons unfavorable to one place or the other. But the observations of most travellers are only skin-deep

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at the best, and my impressions are hardly so deep as that; at the same time they are unquestionably more favorable to St. Paul than to Minneapolis. In the latter place the street architecture is distinctly eccentric, with the eccentricity of Chicago in its earlier Romanesque stage, and yet this phase does not overpower the results of the earlier fashion for "Eastlake" and Collings-decorated work that likewise smote both Boston and Chicago after their respective fires. St. Paul has not been unaffected by this sort of work, but the leaven of a more refined style has worked there with greater effectiveness and rapidity.

Since this was written the competition for the Minnesota Capitol has been decided and the award has been made to Mr. Cass Gilbert, of St. Paul, whose design was obviously one of those which was sure to be included amongst the five recommended by the expert to the attention of the Capitol Commissioners. The fact that Mr. Gilbert is a citizen of St. Paul affords an opportunity for the discontented to allege that the decision was the result of local influence and a strong and well-applied pull, and the fact that out of the five prize-winners three were St. Paul architects can be wrested to point in the same direction. Perhaps some competitors and some disappointed contractors and disgruntled political workers may voice a complaint of this sort. But what can they say to the fact that the Commissioners confined their selection substantially to the five designs that had been endorsed by the report of their adviser, Mr. Wheelwright, and that all designs were considered and judged by him without knowledge of their authorship?

No, the decision of this competition is simply another illustration of the fact that in all competitions the local practitioner, if of relatively equal capacity with the competing outsiders, always has a real advantage. This is partly due to his more perfect knowledge of the site, the local conditions of sentiment, the needs to be satisfied and the cost of labor and materials. Still more is it due to the fact that local practitioners enter such competitions with a greater personal interest in the solution of the problem and better heart and courage, more earnestness of purpose and a sensible feeling of self-respect — if not of vanity — which leads them to really do the best work that lies in them to do. The result is, in other cases as it has been in this, that the designs of local practitioners almost always are practical and practicable solutions of the problem, and generally some of them are so good that no fair-minded expert could fail to include them amongst the prize-winners, even if the actual work must be awarded to an outsider.

In this competition there is no questioning the fact that Mr. Gilbert's design carries off the chief prize on its merits. Of the prize designs of the two outsiders, Mr. Mann's was marked by the elegance of his distribution of light and the treatment of his interior as shown by his section, while Mr. Jones's was substituted seemingly for that of Messrs. Wendell & Humphreys, to whom the first place in the original competition was awarded and whose design in this second competition was amongst the five recommended by Mr. Wheelwright.

Of the two other St. Paul designs, that of Mr. Johnston had such merit that it was easy to see that in re-studying it for execution something of its rather ungrammatical expression could easily have been eliminated. As for the design of Messrs. Bassford and Traphagen & Fitzpatrick, I am free to say that I did not suppose it would be found amongst the five recommended by the expert, but doubtless it had excellences of arrangement in the plan that I did not have time to study. In its place I supposed would be found the design of Messrs. Eames & Young, of St. Louis, which was obviously one of the economical designs and was a carefully studied and refined piece of work: to be sure, it departed somewhat from the time-hallowed formula for the designing of state-houses, in that its low and modest interior dome over the rotunda was not disguised on the outside by a covering dome of different shape and treated with colonnade or ancillary features. In their plan they incorporated a rather obvious arrangement which none of their competitors, save their fellow-townsman, Mr. Mann, appears to have thought of. In arranging the seating for the Chamber of Representatives they placed the chairs in couples which, of course, increased the number of aisles and so facilitated ingress and intercommunication, while it afforded a greater degree of privacy to members while conversing with their fellows on matters political or private. This arrangement had another great advantage: when the Legislature meets as a committee of the whole it naturally gathers in the larger of the two chambers, and the provision of the greater number of aisles in the two St. Louis plans allowed better accommodation for such occasional assemblages than had been provided by any other designs.

Unless some one resorts to an application for an injunction and succeeds in getting one — and of late this device has been resorted to more than once — it is probable that this second competition will result in the erection of Mr. Gilbert's building, for Minnesota is one of those blessed States where the Legislature is not always in session, and the present Commissioners, who have full power to go ahead with the work, have plenty of time to get the building well above the ground before political machinations can interfere with them.

Electricity in Westminster Abbey. — Advantage will be taken of the introduction of electricity into Westminster Abbey, in connection with the new echo organ, to place electric lamps in the choir. There is also some probability that this form of illumination will be extended to other parts of the building in the near future. — *New York Evening Post.*

Books and Papers

If the time ever comes when, as prophesied by some architects, the steel-skeleton construction, to say nothing of the sky-scraper, will be a thing of the past, a recent work on "*Architectural Engineering*"[1] will afford very interesting reading to our successors, not so much as marking an epoch in building operations as by epitomizing and detailing the process of evolution by which human ingenuity has been able to pile up buildings twenty stories high with perfect theoretical safety. The science of skeleton construction is still too recent in its origin, however, for this work to be exhaustive in its character. It presents, rather, a summary of what might be called the best constructive practice in Chicago, and within such limitations it is well written, copiously illustrated, and in a general way covers all of the problems involved in Chicago tall-building construction, from the roof down to the foundations, the subject-matter being treated, quite properly, in the order in which the building calculations are made rather than in the order in which the building itself is constructed. It is not merely theoretical, however. Indeed, except for a somewhat extended analysis of the calculations involved in wind-bracing, the book contains very little mere theory. It is thoroughly up-to-date, and the clearness and thoroughness with which the subject is illustrated and the absence in the main of superfluous matter make the work exceedingly valuable. The chapter on floor-loads is especially good and contains a statement of all the different assumptions which are made by various engineers and architects as to what are the actual loads on floors. In regard to whether these loads should be assumed as being transmitted to the columns and then to the foundation, he states that "it is the judgment of the best engineers that the area of the foundations on the clay should be proportioned to the dead loads only and not to theoretical or occasional loads, so that it is good practice to neglect live loads on the clay for hotels, office-buildings or lightly loaded retail stores."

Mr. Freitag frankly admits that he writes from the standpoint of the engineer, incidentally mentioning that "the ignorance which the average architect displays in connection with structural ironwork is proverbial, and that contractors for steel work have long indulged in considerable sarcasm at the expense of the architect and his plans." It is to be hoped that such a statement is only partially true even in Chicago, and we are quite sure that there are architects in this country who are just as able to decide structural details as any engineer, and in some respects a great deal more so. The engineering bias of the book is clearly shown in the first chapter and part of the second, which as far as the essential character of the book is concerned are entirely superfluous, dealing with the general architectural problem of high buildings. A writer who speaks of the "massive" Parthenon and the "perfect structural beauty" of the Eiffel Tower is hardly a safe guide in matters of art and is entirely off his territory in everything except architectural engineering *per se*. This volume does for the Chicago practice what Birkmire's does for the New York practice, both having the effect of being purely local. They should be read together if one is to properly appreciate the manifestations of the skeleton construction east and west, for while this type of construction is largely credited to Chicago alone, there is relatively quite as much good work of its kind in New York as anywhere else in the country.

An interesting volume might be written on the mistakes which have been made in steel construction. Naturally the illustrations which Mr. Freitag offers are of the good types, and we hear nothing of the many failures. The writer states that two stories can generally be erected in six days of ten hours each. In the Unity Building of seventeen stories the metal work from the basement columns to the finished roof was accomplished in nine weeks. When we consider what such speed means, and also bear in mind that faulty details constitute even a greater part of the defects in the general run of buildings than arises from materials employed or imperfect general features of designs, the wonder is that there are so few absolute failures to record. Many and many are the architects who have used cast-iron columns piled story on story, with tile partitions only as a wind-resisting medium and their structures stand to become a source of wonder to the engineering profession. If some enterprising architectural engineer could gather together the examples of bad skeleton construction, possibly we might learn as much from them as we do from the very admirable illustrations which are gathered into this volume.

One of the fortunate facts for a art student in these end-of-the-century days is, that for a few dollars, wisely expended, he can become the possessor of a collection of pictures — in the form of illustrated catalogues — which will comprise the most notable paintings in the public galleries of the Old World, and the treasures of the Pinacothek, the Louvre, the Luxembourg and the National Gallery are thus brought to his door.

He can now add to these a similar *brochure* on an American

[1] "*Architectural Engineering*," with special reference to High Building Construction, including many examples of Chicago Office-buildings. By Joseph Freitag, B. S., C. E. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1895. Price, $2.50.

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gallery, for the Pennsylvania Academy of the Fine Arts has published an album[1] containing some thirty admirable reproductions of the most important pictures in its permanent collection.

The artists represented range from a fifteenth-century Italian — Benozzo Gozzoli — to an able military painter of our own day, William T. Trego — what miles of canvas have been covered with paint in the four hundred years that lie between these two! — and the pictures include such celebrated works as Vanderlyn's "Ariadne" and Allston's "Dead Man Restored to Life." Among the most satisfying of the excellent reproductions we must specify Van der Helst's "Violinist," the charming portrait of Miss Bordley, by Gilbert Stuart, Bridgman's "Roumanian Lady" in her rich, quaint costume, and Picknell's "Borders of the Marsh."

The book is handsomely gotten up and well-printed on good paper with generous margins, and is worthy of a place in the library of every lover of art.

Though the oldest of our public art institutions, the Pennsylvania Academy of Fine Arts is distinctly "up to date" in this enterprise and we hope that her example may be followed by other American art-galleries.

SOCIETIES

THE T-SQUARE CLUB OF PHILADELPHIA, PA.

THE T-Square Club of Philadelphia held its annual election in its Club-room in the School of Industrial Art on Wednesday, Nov. 6. An unusually large attendance was present to view the summer sketches and to participate in the election of officers. The result of the election was as follows :

Albert Kelsey, *President;* E. V. Seeler, *Vice-President;* Adin B. Lacey, *Secretary;* David K. Boyd, *Treasurer;* Walter Cope, Louis C. Hickman and Wm. L. Price, *Executive Committee.*

A House Committee was elected and the Chair appointed Horace Burrell, E. C. Schermerhorn and Frank A. Hays to act as an Entertaining Committee for the ensuing year. The event of the evening was the announcement of a liberal gift to the Club of one hundred dollars from an "unknown friend." A vote of thanks was taken, entered upon the minutes of the Club, and the treasurer was directed to personally thank the donor.

The summer sketches submitted at this meeting were evidence of a great amount of earnest work during the past summer. Mr. Walter Cope received First Mention; Mr. Wilson Eyre, Second Mention; Mr. Walter Price, Third Mention.

Among the other contributors were J. J. Bissegger, John Dull, Charles Klauder, Lloyd Titus, G. Basset, F. W. Bancroft and Edw. Gilbert.

The course of lectures for this year will soon be announced and will doubtless prove very instructive and interesting. Mr. Frank M. Day speaks first of his travels in Sicily. Mr. Cope, later on, will speak of his trip through Spain.

ADIN. B. LACEY, *Secretary.*

SOCIETY OF BEAUX-ARTS.

THE Committee on Education, of the Beaux-Arts Society and the Jury of Award, beg to report that the following drawings submitted in the several competitions mentioned hereafter, have received the following awards:

COMPETITION FOR A CITY CHURCH, PROGRAMME CLASS A, JUNE, 1895.

Mr. Mortimer Foster (pupil of Masqueray & Chambers), *First Mention.*

Messrs. Berger & Debus were placed *"Hors de Concours."*

COMPETITION FOR A RESTAURANT IN A PARK, PROGRAMME CLASS B, JUNE, 1895.

Mr. P. Reginald Allen (pupil of Masqueray & Chambers), *First Mention.*

Mr. John S. Gibbs (pupil of Masqueray & Chambers), *First Mention.*

Mr. Arthur Shrigley (pupil of University of Pennsylvania, Department of Architecture), *First Mention.*

Mr. John A. Holly (pupil of Masqueray & Chambers), *Second Mention.*

Mr. George Baum (pupil of University of Pennsylvania, Department of Architecture), *Second Mention.*

Mr. Alfred Morton Githens (pupil of University of Pennsylvania, Department of Architecture), *Second Mention.*

Mr. Joseph L. Chesebro (pupil of Joseph McGuire), *Second Mention.*

Mr. E. J. Willingale (pupil of Masqueray & Chambers), *Second Mention.*

Mr. Francis W. Bancroft (pupil of University of Pennsylvania, Department of Architecture), *Third Mention.*

COMPETITION FOR A DEPARTMENT STORE, PROGRAMME CLASS A, SEPTEMBER, 1895.

Miss M. L. MacNaughton (pupil of Carrère & Hastings), *First Mention.*

Mr. E. J. Willingale (pupil of Masqueray & Chambers), *First Mention.*

COMPETITION FOR A LIBRARY IN A SMALL TOWN, PROGRAMME CLASS B' SEPTEMBER, 1895.

Mr. Edwin S. Morton, *Second Mention.*

Mr. Francis S. Swales, *Third Mention.*

The Committee wish to make the following comments:

Competition for a City Church. — Messrs. Berger & Debus were placed *"hors de concours"* for not conforming with the conditions of the programme, which required a Classical composition. The Committee regretted not being able to offer more encouragement to these competitors, as their drawings showed a good deal of work, though the Committee believed entirely in the wrong direction, and they hope that Messrs. Berger & Debus will enter some of the coming competitions more successfully; the general feeling of the Committee being that their work deserved encouragement.

Mr. Mortimer Foster was awarded a First Mention for the excellency of his plan, which shows a good deal of study from the artistic standpoint. The Committee regretted that the elevation and sections did not show the same degree of ability, and hesitated upon giving a First Mention on this account. The award was made, however, on the plan, which deserved recognition.

Competition for a Restaurant in a Park. — The number of drawings submitted for this competition was very large, and the general character of the work was exceedingly interesting and in the spirit of the programme, both as to scheme and character of elevations and rendering. With one or two exceptions, all of the drawings submitted were deserving of recognition.

In the case of the drawings which did not receive any award, the lack of study in the plans (which were confused and which did not provide for proper circulation and light) had the most influence with the Jury.

The entire scheme, plan, section, elevations and rendering of Mr. P. Reginald Allen, was especially interesting and deserving of attention, and the drawings submitted by Mr. John S. Gibbs and Mr. Arthur Shrigley, though not as well studied throughout, showed considerable ability, and were awarded the First Mentions without hesitation on the part of the Jury.

Competition for a Department Store. — Both drawings receiving awards were interesting, both in conception and study. The Jury considered that Mr. E. J. Willingale's design was especially successful — the plan being well-studied and a fairly typical plan for the programme, and the elevation and section (especially the section) being exceedingly interesting. This design, in the judgment of the Jury, was capable of study and development, and was thoroughly satisfactory.

Miss MacNaughton's elevation was very highly commended by the Jury, though not quite as much in keeping with the programme as Mr. Willingale's. The scheme was frank and well-handled — the plan was less successful, the arrangement of points of support being weak, and the arrangement of the staircases and circulation being less direct than in Mr. Willingale's plan; the whole scheme being capable of study and development.

Competition for a Library in a Small Town. — The Jury was particularly interested in the two premiated drawings for this programme, as they understood that the authors had not received the advice or assistance of a professor.

The scheme submitted by Mr. Edwin S. Morton was most interesting, though lacking in study. The scheme submitted by Mr. Francis S. Swales, though less original and less well-presented, was also interesting.

The Committee wish to thank the students for their interest in the work so far, and to request that all of the students should feel at liberty to write and ask for further criticisms of their work.

The Committee propose to arrange for a meeting, after the judgment of the next competition, to which all of the students will be invited, to listen to criticisms by the different members of the Society, for the special benefit of the students.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

THE ENTRANCE GATEWAY: "AULDWOOD," ESTATE OF J. C. HOAGLAND, ESQ, SEABRIGHT, N. J. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Heliochrome issued with the International and Imperial Editions only.]

DESIGN FOR FREE PUBLIC LIBRARY AND MANUAL AND INDUSTRIAL TRAINING SCHOOL, HOBOKEN, N. J. MR. JAMES ROSS, ARCHITECT, YONKERS, N. Y.

THE perspective of this design has been accidentally omitted from this issue, but will be published next week.

[1] Pennsylvania Academy of the Fine Arts: *"Album of Reproductions of Selected Works in the Permanent Collections."* Philadelphia; Published by the Academy. Price, $1.

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HOUSE FOR MR. NEWBOLD, LAVEROCK, PA. MR. G. T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

FIELDSTONE TERRACE FOR DANA ESTES, ESQ., BROOKLINE, MASS. MESSRS. CABOT, EVERETT & MEAD, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

LIBRARY CHIMNEYPIECE: "AULDWOOD," HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

DINING-ROOM CHIMNEYPIECE IN THE SAME HOUSE.

[Gelatine Print.]

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COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"HEAVY FOUNDATIONS ON THE LOT LINE."

NEW YORK, November 11, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Permit me to make one slight correction to my letter in your paper of the 9th instant. The minimum pressure is *minus* 6,160 pounds. In other words a pressure ranging from 6,160 pounds per square foot at the edge to 0 pounds at the zero point would have to be exerted in order to prevent this edge from lifting off the ground. This shows the uselessness of any footing beyond that point.

There are several solutions to the problem, the one you gave being theoretically the best. The following has been used in one case: the batter carried up above the first tier of beams, tie-rods with large stars on outside of walls were placed across the building and brought to their proper tension. The battered wall on the inside was considered as an inclined strut, the horizontal component of its strain being taken up by the tie-rod on top and friction and side pressure against the earth below.

I have been asked if the fact that a wall next door would or might be erected would not balance this equality. It would hardly do so, because the walls being independent, both they and the footings have independent settlements, and not being held together by the tenacity of the latter at its point of greater strain, the footings must act independently. It is only after the soil has yielded so as to bulge the walls that these then may act together, which, however, will not relieve the pressure on the soil.

Very truly yours, OSCAR LOWINSON.

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opened October 14.

Exhibition of Water-colors: at the St. Botolph Club, October 28 to November 16.

Photographs of the Work of Burne-Jones: at Walter Kimball & Co.'s Gallery, 9 Park St.

Illustrations of Shakespeare's Comedies by Edwin A. Abbey: at J. Eastman Chase's Gallery, 346 Boylston St.

Drawings made for the "Ladies Home Journal": at the Boston Art Club, opens November 16.

Vinton's Portrait of Archbishop Williams: at Williams and Everett's Gallery, 190 Boylston St.

BRIDGEPORT, CONN. — *Exhibition of Artistic Posters:* at the Public Library, November 9 to 30.

CHICAGO, ILL. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

NEW YORK, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice." also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Loan Exhibition of Portraits: at the National Academy of Design, October 30 to December 4.

Sixth Annual Exhibition of the New York Water-color Club: at the Galleries of the American Fine-Arts Society, 215 West 57th St., November 11 to 23.

Illustrations of Shakespeare's Comedies by Edwin A. Abbey: at H Wunderlich & Co.'s Gallery, 868 Broadway.

Works by Gerke Henkes: at the Holland Art Galleries, 329 Fifth Ave.

Sir Joshua Reynolds's "Death of Dido": at the Blakeslee Galleries, 353 Fifth Ave.

Drawings by A. B. Frost, illustrating "Uncle Remus": at the Gallery of F. Keppel & Co., 20 East 16th St., November 11 to 21.

Sir Joshua Reynolds's "Shepherd Boy," Courbet's "Woman with a Parrot," etc., etc.: at the Durand-Ruel Gallery, 389 Fifth Ave.

Works of Frederic Remington, the Smith Jewels, and Chinese Porcelains: at the American Art Galleries, Madison Square South.

PHILADELPHIA, PA. — *Autumn Exhibition of the Philadelphia Art Club:* opens November 16.

PITTSBURGH, PA. — *Loan Collection of Paintings:* at the Carnegie Library, during November.

NOTES AND CLIPPINGS

THE TOMB OF RENE OF ANJOU. — King Rene's body was recently exposed by an accident in the cathedral at Angers. In repairing the choir, workmen broke through the roof of a vault in which were two coffins. The wooden cases had rotted away, and the leaden cover of the one containing the old king of Naples and Duke of Lorraine and Anjou had been torn off. The skeleton had a crown of thin gold about its head, and in its hands the sceptre and globe, which, being of bronze, had turned green. The other coffin, containing his wife, Queen Isabella, of Lorraine, was intact and was not disturbed. After the inspection the vault was sealed up again. Over it there was formerly a splendid tomb, destroyed in 1794, but the vault escaped injury, in consequence of the woodwork and stalls concealing it. — *Exchange.*

HOUSE-BUILDING IN SIAM. — A curious method of house-building is practised in Siam. When the soothsayer has found a suitable spot for the site of a house, and declared it in every way felicitous, the family who wish to build the house gather together the necessary materials, then invite all their relatives and friends. On the day fixed, all these arrive in a crowd, armed with picks, bill-hooks, knives, hatchets and saws. Some dig the holes in which to place the supports, others cleave the bamboo or prepare the woodwork. Before night the light habitation is completed, but everything is uneven, notably the steps, the windows and the doors. The columns are ornamented with red and white rags, which are supposed to bring happiness; the unevenness of doors and windows is supposed to avert the coming of evil spirits. — *Illustrated Carpenter and Builder.*

ASPHALT DEPOSITS IN THE UNITED STATES. — The growing use of asphalt for street pavements has stimulated inquiry as to the possible deposits of the material in this country so situated as to make its mining profitable. To-day almost all that is used comes from abroad, much of it from Trinidad, and some of it from the mainland of South America, from Syria, Germany, Switzerland and France. Yet it is claimed by experts in the service of the Geological Survey that the United States has the best quality and the largest quantity of asphalt to be found in any country. The problem is how to get it as cheaply, and this economic side of the question is to be investigated by agents of the Geological Survey. Asphalt deposits have been discovered in West Virginia, Ohio, Kentucky, California, Utah, Oklahoma, Montana, Texas, Arizona, Idaho, New Mexico, Nevada, Wyoming, Oregon and Washington. Only four States make commercial use of their deposits — California, Kentucky, Texas and Utah — and yet during the past year these four States mined over half as many tons of asphalt as were imported. The native asphalt is claimed by E. W. Parker, of the Geological Survey, to be superior for paving to the imported article, as it contains more gritty matter, and will, therefore, wear longer, and not be as slippery. — *N. Y. Evening Post.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

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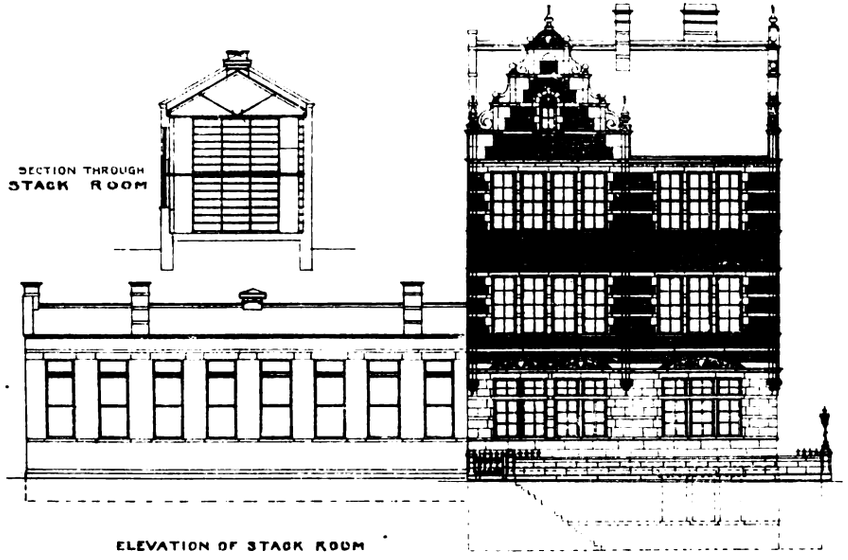
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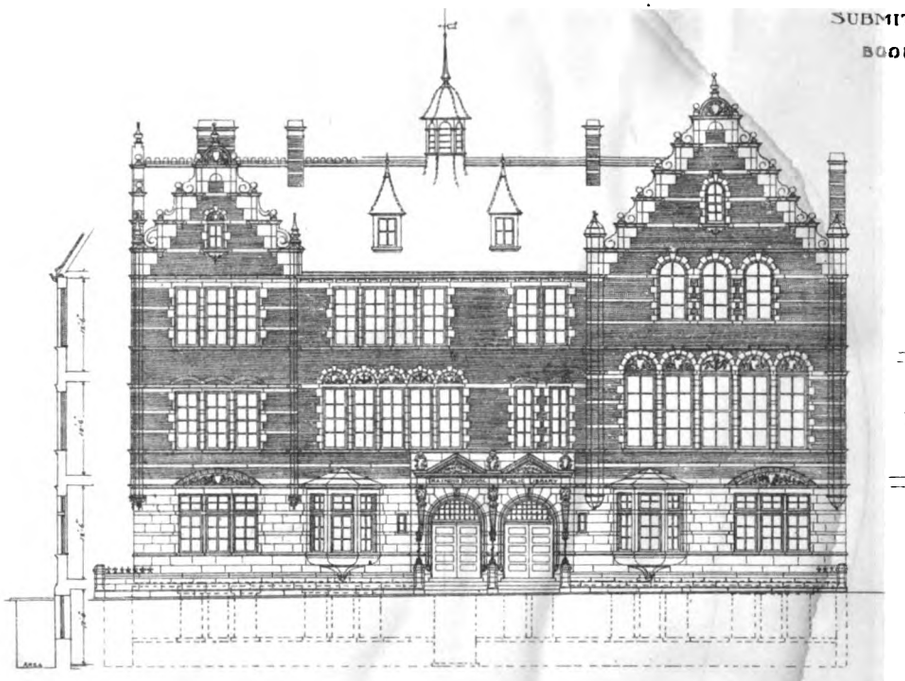
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ELEVATION OF STACK ROOM

ELEVATION ON FIFTH STREET



ELEVATION ON PARK AVENUE

SCALE 1/8 INCH = ONE FOOT

James Rees
Architect
Jersey City, N.J.

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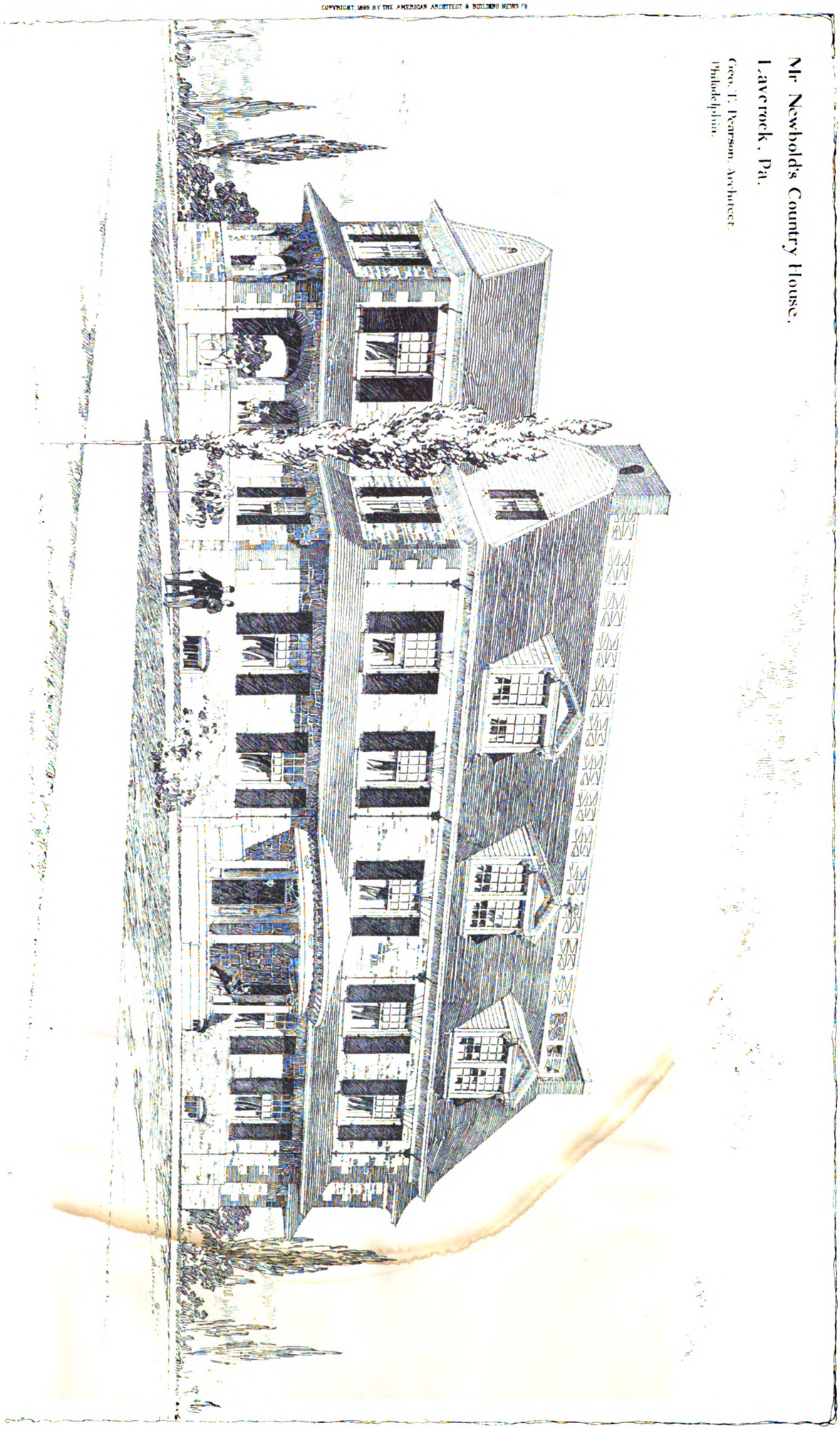
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Mr Newbold's Country House,
Lavcrock, Pa.

Geo. L. Pearson, Architect
Philadelphia.



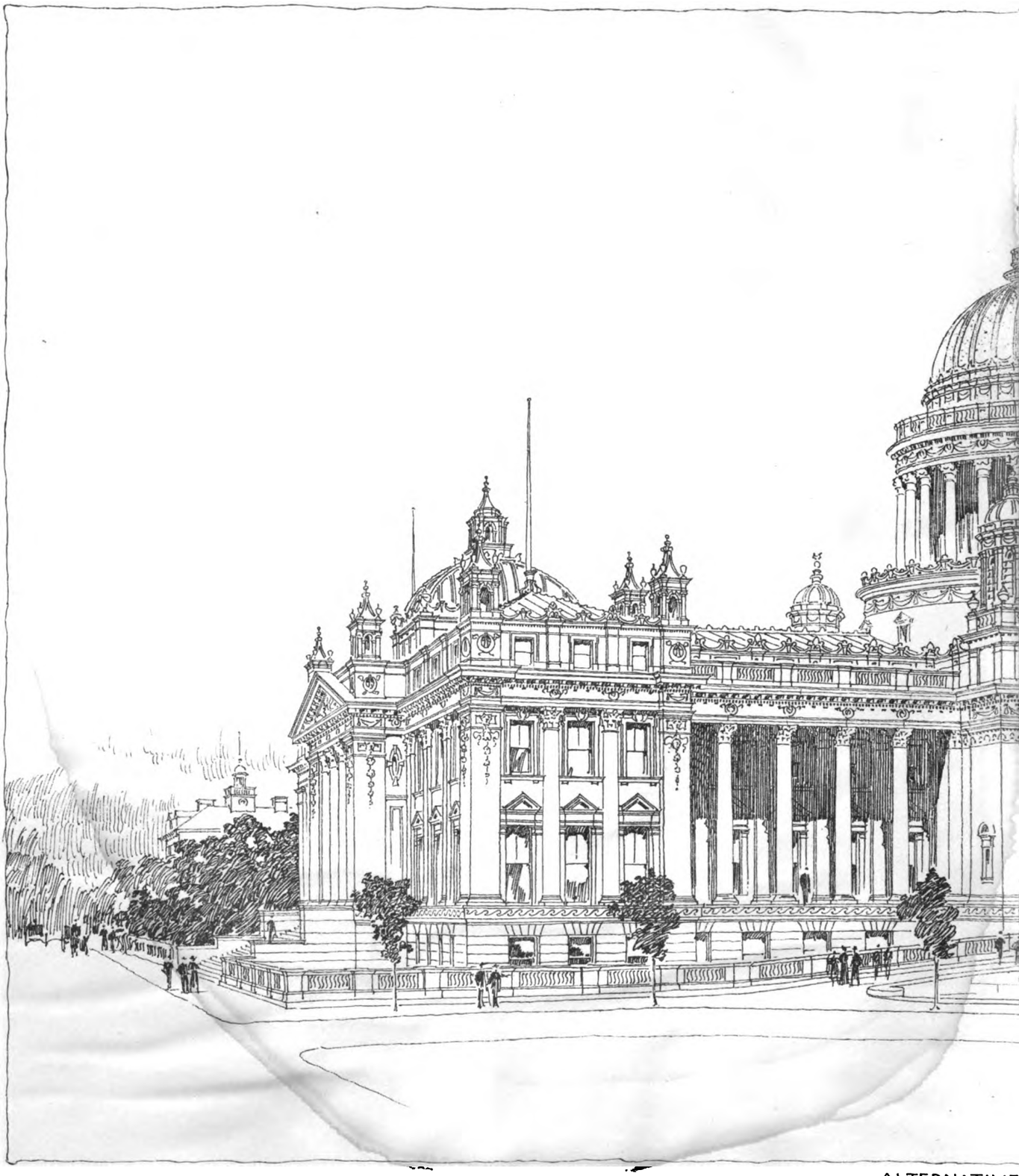
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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. L.

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NOVEMBER 23, 1895.

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THE fire of last week, which destroyed the Manhattan Bank Building in New York, has excited a great deal of discussion among architects, insurance-men and fire-engineers. Mr. Bonner, the chief of the New York Fire Department, has, as is usual with him, expressed, clearly and sensibly, views which will be approved by most architects. The conclusion at which observing architects arrived some time ago, and which has been repeatedly set forth in these columns, that a high building, mainly of steel or iron, may easily be made safe against fire originating within it, but that it is extremely difficult to protect it against the effect of conflagrations near to it, is just that which Chief Bonner most insists upon; but he adds, from observation, some very instructive details. It seems that the Manhattan Building was a rather favorable specimen of the fireproof construction of fifteen or twenty years ago, the ironwork being to a certain extent protected, in a manner which was then unusual. The fire originally started in a building of the ordinary sort, thirty feet away from the Manhattan Building, and it was with astonishment that the firemen saw the latter take fire from a blaze so far off. Not only did it take fire, but the effect of the fire upon it was extremely destructive. The columns and girders soon twisted away from their connections, letting the floors fall, and the fall of these involved the ruin of the walls. So energetic was the action of the heat in tearing the structure to pieces that a large number of firemen were injured before they could escape, and Chief Bonner is said to have declared that he would never again send a man into a blazing fireproof building.

THE Manhattan Building was only nine stories high, and it is interesting to consider how a twenty-story structure of the same sort would behave under similar circumstances. According to Chief Bonner, most of the modern fireproof buildings would suffer the same fate, and the rapidity of their destruction would be in proportion to their height and the consequent rapidity of the upward current that the fire would establish in them. So far as the structures themselves are concerned, he thinks that a modern fireproof office-building is safe against fire originating within it; but that buildings of the same class, if used for mercantile purposes, or for storage, and filled with combustible goods, will succumb to the intense heat generated by the blazing column of fuel, and, in the same way, are exposed to destruction from the influence of a conflagration in the immediate neighborhood. That this opinion is well-founded, all architects understand, and, so far as we know, no architect pretends that a steel structure, however protected, will act as a fortress against a conflagration outside. If any one makes such a claim, it is more likely to be the agent of some patented system of fireproofing than an architect; yet the newspapers talk as if the architects of New York were in some way to blame whenever any fireproof structure succumbs to forces which it was not expected to resist. The fact is that, as every architect and builder, and every sensible owner, knows, it is impossible, in a city, three-fourths of which is occupied by buildings mainly of wood, to construct a building which will resist fire from the outside as well as the inside, without making sacrifices of light, floor-space and money, which are disproportionate to the advantage gained; and the problem placed before architects, which they have solved in this country, on the whole, with brilliant success, is to design structures which shall be light and strong, and shall be out of reach of danger from small fires. It is in the solution of this problem that the cased steel construction has been developed. Apparently, the newspaper reporters imagine that this sort of structure was designed as an advance in fireproof construction; whereas, as every architect knows, it was devised as a means for obtaining increased rentable floor-space in buildings on valuable land, without sacrificing too much in solidity and fire-resisting capacity. No architect pretends that the cased steel walls are as secure against fire as the thick brick walls which they supersede; but, as they can be built thin, and thus save to the owners a large annual sum in rent, it is financially profitable to owners to build them; and the architects who have perfected them have simply fulfilled a requirement of the first importance, at a sacrifice of security which they have tried, and tried successfully, to make as small as possible.

AS we have often said, any one who wishes to have his building, before all other considerations, fireproof, can get what he wants from any architect of reasonable skill; but he must understand, as the architect will tell him, that he must take the Pyramids of Egypt as his model. To pile up thick walls of brick, with few and small openings, floors vaulted in brick, and stone stairways, enclosed in brick walls, is easy enough for the architect, but no owner would ever accept such construction. What owners want, and must have, in order to be able to rent or use their buildings profitably, is light and slender construction, with large openings. These are the prime requisites, and such fireproof quality only is admissible as can be obtained without sacrificing them. The problem set before our architects has been, therefore, to improve the fire-resisting quality of a system of construction which is in itself very vulnerable to fire, but which, for quite sufficient reasons, they are not allowed to change. No fair-minded man can deny that, in the solution of this problem, our architects have been extremely successful. The science of protecting structural ironwork against fire, of building light masonry floors and roofs, of lining walls with damp-proof and fireproof furring, which has modified the art of construction throughout the world, is the product mainly of the observation and ingenuity of American architects, and has been developed with very little sympathy from their clients or the public. To show how little thought is taken by any persons except architects and underwriters about security against fire, it ought to be sufficient to refer to the latest fashion of construction, which consists in building walls of steel, cased with brick. No architect would advise a client to use such construction on cheap land, or would say that it was as fire-resisting as solid brick masonry; but where land is worth two hundred dollars a square foot, and the walls of a ten or fifteen-story building may, by using it, be made sixteen inches thick, instead of three feet, the saving in rentable space inside the building is so great as to outweigh all other considerations, and the architect must accept it, and do the best that he can with it. No one pretends, least of all the architects, that such a structure will withstand a conflagration, but it will resist the effect of fire, either from the inside or the outside, far better than any structure with such large floor-space and ample windows ever built before, and this quality has been conferred upon it by the science and skill of American architects

WE have again and again expressed our want of sympathy with unsuccessful competitors who have taken part in one of the old-fashioned scrambles called "open competitions." Now we will declare that we have as little sympathy, and less respect, for those who, having taken part in a properly conducted competition, are willing to show their inappreciation of normal propriety of behavior by impeaching the fairness of the man, or men, who have decided a competition in their disfavor. No expert adviser pretends to be infallible in judgment, and it is always possible that, in a matter where taste and

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personal bias in the matter of style must always count for something, he may be unconsciously influenced in his decision by his own predilection in favor of what nearest approaches his preconceived idea of what should be the treatment of the problem. This difficulty is inherent in the situation, but it is not a very serious one, and certainly is not enough to weigh against the judgment of a man of known rectitude and ascertained education in architectural matters. But every expert, it seems to us, has a right to expect from those who willingly and wilfully submit their designs to his consideration, at least, the courteous treatment that one gentleman accords to another. A member of the bar, who in the public prints criticises a judge's ruling, and assails his judicial character with innuendo and allegation, can, we believe, be punished for contempt of court, and perhaps the time may come when some similar protection can be afforded to the judges in architectural competitions. Until that time does come, however, it seems to us that it ought to be understood that any unsuccessful competitor, in a properly conducted competition who publicly attacks the decision and character of the judges should be consigned by right-feeling architects to the limbo of professional Coventry.

THE Housesmiths' Union, of New York, which is celebrated for the assaults that it has made upon building interests in that city, and the multitudes of men that it has thrown out of employment, has entered upon another campaign of wanton mischief. There are said to be about twenty-five hundred of these men in the city and suburbs; and, as all building-operations have to stop as soon as they drop their tools, they have their unfortunate comrades at their mercy. The ostensible purpose of their strike is to extract by force from the community an addition of fifty cents a day to their wages; and they consider the present a very favorable time for their operations, because a great deal of building is going on, and is being hurried, to escape the unfavorable winter weather, while their fellow-mechanics, who have to pay the piper for the housesmiths' dancing, are particularly anxious at this season to keep at work, so as to save up something to carry their families through the winter, when employment is hard to find, and shoes and stockings, mittens and coal and blankets, must be bought and paid for. Already, twenty thousand building workmen are said to be idle, waiting until the housesmiths permit them to resume their tasks; and the Central Labor Union, which, as usual, has "exhausted every means" to prevent the housesmiths from striking, is said to be on the point of calling out sixty thousand men to show its "sympathy" with their performances.

BALTIMORE has followed the example of several other large cities, in appointing a fine-art Commission to regulate the admission of statues and monuments to the public parks. The Commission consists of the Mayor of the city, and Messrs. Mendes Cohen, as representative of the Maryland Historical Society; James L. McLean, representing the Johns Hopkins University; Joseph M. Cushing, representing the Maryland Institute; J. B. Noel Wyatt, representing the Architectural Club; David L. Bartlett, representing the Park Commissioners; and Joseph E. Sperry, representing the Charcoal Club. The ordinance creating the Commission provides that no statue, ornamental fountain, arch, gateway, monument or memorial of any kind shall be erected, or any change made in those already erected, in any public street, avenue, square or park, or in any municipal building, unless the design and site of the same shall have been approved by a majority of the Commission.

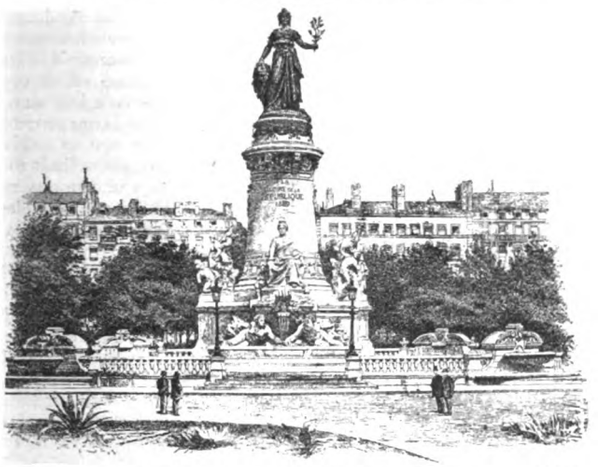
THE hostilities against the Supervising Architect of the Treasury Department, which, apparently, are periodically revived by disappointed contractors, are, it is said, to be renewed in Congress at the next session. The regular charge made is that "favoritism" is shown, in awarding contracts to persons or firms other than the lowest bidders; and the contractors who feel themselves aggrieved by such action are said to be ready to take their revenge at the first favorable opportunity. As we have always maintained the principle that the fact of being the lowest bidder is only one of the points to be considered by architects and owners in deciding whether to award a contract to a particular contractor, we are quite willing to believe that the "favoritism" alleged against the Treasury officials was exercised for the best interest of the public. The Philadelphia *Press* relates as an example of the methods complained of, that, in September last, bids were invited for the structural ironwork for the eight upper stories of the Appraisers' warehouse in New York, two stories of which had already been built. The lowest bidder for the upper stories was the firm of Post & McCord, the next being Michael Giblin, the contractor for the two stories already erected. Giblin's estimate was about eleven thousand dollars higher than that of Post & McCord. The latter, according to the *Press* account, had made it known that they would procure their stock from the Carnegie Company, of Pittsburgh. Naturally, Post & McCord, against whom no objection could possibly be brought, expected to receive the contract; but, on November 1, they, with the other bidders, were notified that all the bids had been rejected, and that new ones would be invited.

WITHOUT knowing anything of the merits of this particular case, we say without hesitation that any architect might have many good reasons for pursuing the same course as the Treasury officials. If he thought that all the bids were too high, he would be quite justified in rejecting them, and calling for new ones; and, in many cases, the advantage to the interest of the owners in other respects of having the same contractor who had completed two stories of a building go on with the rest of it would be worth much more than the difference of less than three per cent on the total amount of the contract which appeared between the Giblin and Post & McCord bids. Moreover, the announcement of Post & McCord, supposing it to have been really made, that, if the contract should be awarded to them, they would order their steel from the Carnegie Company, was certainly an important element in their proposal. All architects know that in the last few months the Carnegie mills have been overwhelmed with orders for structural steel, so that, as has been reported, they would not accept contracts with a stipulated time for delivery. For many private undertakings, and, presumably, for some public ones, this would be a serious matter; and a contractor who could show that he could secure his materials within a specified time might justly be preferred, even if his bid were not the lowest. Undoubtedly, any private or public architect would be glad to have such work, under his charge, constructed out of Carnegie steel by such a firm as Post & McCord; but circumstances often arise which necessarily modify an architect's decision. Some years ago, one of the New York papers, anxious to make a political point against the Commissioner of Public Works, raised a terrible outcry, charging him with favoritism, not to say corruption, because he had invited bids for a large amount of granite work from what seemed to it a suspiciously small number of contractors. All the architects who read its "revelations" probably laughed, for the simple reason that the list of the invited contractors included the names of all the principal granite-dealers in that part of the country, and the only ones, probably, who could have furnished the required amount of good and uniform stone; yet this paper chose to hold up a citizen in high office for a considerable time to the scorn and indignation of his fellowmen, without taking the trouble to ascertain whether there was any foundation for its reproaches; and, in the same way, every contractor who has a grievance against an official who has simply used his lawful discretion, in a way displeasing to the contractor, seems to find some newspaper ready to disseminate his mean insinuations without making any effort to ascertain the truth of them.

THE Pittsburgh Director of Public Safety, Mr. J. O. Brown, recently stopped Sunday work on a large office-building, on the ground that the riveting and hammering on the steel frame disturbed the church services held in the neighborhood, and annoyed citizens. In order to make sure that his orders were obeyed, he stationed policemen at the building, with directions to arrest any one who should attempt to work in it. As it happens, the contracts require the structure to be completed by April 1, and work is being carried on night and day to enable the contractor to fulfil his agreement; while the owners are also held by contracts with tenants, to whom they have promised to give possession of their rooms on the first day of April; so that the courts will probably be called upon to say whether the work must be interrupted on Sundays. Meanwhile the Christian Endeavor Society has, by threat of prosecution, stopped Sunday work on a new water-main which is being laid through the streets, and is said to have in mind further measures of a similar character.

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AMSTERDAM FIRE CONGRESS, 1895.—I.



Monument to the French Republic, Lyons, France: M. Blavette, Architect; M. Peignot, Sculptor. From *La Semaine des Constructeurs.*

FROM September 24th to September 28th, there assembled in Amsterdam, fire-experts, architects and engineers from all parts of the world, called together on the invitation of the Committee of the Amsterdam International Exhibition to discuss all matters relating to fire-prevention, fire-extinction, salvage, construction and planning of buildings in respect of danger from fire.

The papers which were read were of unusual interest to architects, as they embraced the following subjects, under three sections:

SECTION 1.

1. Storage of inflammable merchandise.
2. Construction of ovens, fireplaces, furnaces, chimneys, etc.
3. Spontaneous ignition, and its prevention.
4. Constructing lamps, stoves, electric-light installation, lightning conductors.

SECTION 2.

This section was devoted to the extinction of fire, and salvage, and numbered among other papers those devoted to the following topics:

1. The organization of the fire-service.
2. The best system of fire-alarms in large and small towns and villages.
3. The employment of water-mains for extinction.
4. The construction of fire-engines and smaller fire-appliances.
5. Design and arrangement of the interior of the fire-stations, which subject was of special interest to the members of the congress, as a paper was read by Mr. Thomas Blashill, F. R. I. B. A., the superintending architect of the London County Council, illustrated by drawings of some of the most recent fire-stations erected in London from his designs.

It is believed by many fire-experts that the London fire-stations are the best in the world, and whatever may be said as to the superiority of the organization of fire-services abroad, the advancement made in the perfection of the arrangement of the stations themselves, and the accommodation for the men, has been greater in London than in any other city.

6. A paper dealing with the means of lessening damage caused by fire was read by Mr. Edwin O. Sachs, the Honorary Secretary in London of the Congress. This paper dealt with the subject in a manner which satisfied the views of the insurance delegates.
7. Life-saving apparatus for fire-brigade use and help was also discussed.

SECTION 3.

But the third section undoubtedly was the most interesting to the architects who attended this congress, for it included papers upon:

1. Fireproof materials and construction, the construction and interior arrangement of houses.
2. The planning and construction of theatres, assembly-halls, hospitals, factories, workshops and warehouses.
3. A paper on the protection of theatres from fire was contributed by Mr. Ernest A. E. Woodrow, A. R. I. B. A., whose name is familiar to the readers of this journal in connection with the articles now appearing on "Theatres."

Other papers were read from various specialists abroad, for instance, Mr. F. C. Dufour, the engineer of Amsterdam, contributed an essay on electric-light installation, from the point-of-view of danger from fire, while Mr. M. P. Grebel, of Siemens & Halske, of Berlin, opened a discussion upon the perfecting of the system of electric-furnaces.

Mr. I. E. G. Noordendrop, architect of Bussum, read a paper upon the experience he has acquired of the relative resistance of wood and iron in the case of fire, and the best means of protecting these materials against the action of fire. Mr. Prinz, chief of the fire-brigade of Altona, gave his views upon fire-resisting materials. Mr. G. A. Huygen contributed an article upon the caution to be enforced in installation of ventilating and heating systems. Mr. Edwin O. Sachs opened a discussion upon the safety of audiences in theatres.

Mr. J. H. Neizen, director of public work of Rotterdam, gave his notes concerning the construction and measures of safety in buildings, having reference to the danger arising from fire.

There were many other papers in the programme, which do not so readily appeal to the mind of the architect and which we have not therefore mentioned here.

Such an assembly as this gives an opportunity of discussing and airing the views of experts from various countries, enables them to compare their experiences and give their opinions upon many technical matters, which are of the greatest service as the means of saving life and property. The prevention of fire is undoubtedly one of the most important duties of the architect, who, indeed, has more power by the manner in which he designs his plans to overcome this enemy, and to provide for the safety of life, than any other profession or body.

We may hope in a future number to give some extracts from several of the foreign papers, at the present moment we will confine our remarks to those contributed by Mr. Thomas Blashill, the architect to the County Council of London, Mr. Sachs, the English Secretary of the Congress, and Mr. Woodrow, late of the Theatres Control Department of London.

In the paper by the architect to the Council we learn that the fire-brigade under the London County Council, has fifty-seven land fire-stations, besides four floating stations upon the river Thames. The land stations accommodate more than nine hundred men who are exclusively employed in the service of the fire-brigade. There are also ten small portable stations in the streets, which each accommodate two or three firemen; and two hundred fire-escape stations.

The fire-stations vary greatly in their arrangements, some being more than thirty years old. These are likely to be superseded within a few years.

The paper describes the more recent kind of fire-station now being erected in London at the rate of about four new stations per annum. In the design of a fire-station, Mr. Blashill states that it is essential that the architect should be in close touch with the chief officer of the fire-brigade. During many years past, all stations have been designed after the most careful consultation with the late chief officer, Sir Eyre M. Shaw, K. C. B., and the present chief officer, Mr. J. Sexton Simonds, and their advice has always been placed at the service of the fire-brigade committee.

The main objects in the design of a fire-station, the author proceeds to say, are the proper accommodation of the firemen and fire appliances, and to insure that upon the receipt of an alarm of fire the engine and other appliances, with their complement of firemen and horses, can be dispatched in the shortest possible time. All the arrangements are directed towards this end. A satisfactory fire-station of the ordinary kind can be built upon a site which is 50 feet wide and 100 feet from front to rear. Stations have been built of less dimensions than these, but the sites of some of the larger stations measure considerably more.

Brompton station measures 52 feet across and only 58 feet from front to rear. The New Cross station measures 120 feet in width and 170 feet from front to rear. This last is the main station in one of the five districts into which London is divided.

It is desirable that the station should be placed on a corner site, so that it may have two faces fronting the streets. It is sometimes possible to find a site with three faces to the streets, but there are stations, of which Brompton is an example, where the front and rear only face streets.

The chief part of a fire-station is the engine-room, which should be about 27 feet wide and 34 feet from front to rear; this will accommodate two fire-engines, standing side by side, and leave sufficient room for passing between. Wherever it is possible, the stable is placed immediately behind the engine-room into which the doors of the stable open. The horses, which it is thought necessary to keep ready for duty, stand with their heads facing the engine-room, but there are generally one or two spare stalls of the ordinary kind where the horses may rest.

The watch-room is a front room adjoining the engine-room and is in telephonic communication with the chief stations, and with many of the larger public and private buildings, as well as with many fire-alarm posts placed in the streets.

In the larger fire-stations, the engine-room contains one steam fire-engine and one manual fire-engine, but as fire-hydrants are now being placed at short intervals all over the metropolis (nearly 20,000 having already been fixed) it is not necessary to use so many fire-engines, and in the smaller stations the place of the manual engine is now occupied by a truck with escape-ladder and other fire-appliances.

With regard to the accommodation of the officers and men, it is now the practice to provide in each station a recreation-room, where the men can spend their time when waiting their turn on duty. The single men, if any are accommodated, have their own mess-room and dormitory. Each of the married men is provided with a kitchen, a bed-room and a scullery. The engineer in charge of a small station has one additional room, and the superintendent in charge of a district has two additional rooms, besides an office and a

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bath-room. The London County Council has increased the accommodation of the firemen by adding the recreation-rooms and the sculleries.

It has been the practice to provide the entrances to the quarters of each married fireman from a passage in the main building, but recently these entrances have been made as far as possible from open galleries, so that each man has practically a separate house, to which access is gained directly from the open air.

The stations are usually built four or five stories above the ground level, according to the situation and the accommodation required. There is only one entrance to the station, and that is through the engine-room, so that when a man enters or leaves the building he can leave notice at the watch-room.

A shaft for drying fire-hose is enclosed in the staircase and is about 56 feet high. Over the staircase is a look-out tower, which is generally about 80 feet high.

Drying-closets, for drying the men's clothes, coal-stores, wash-houses, bath-rooms, etc., are also provided; also lifts, to take coals, etc., to the upper floors.

It is hardly necessary to say that a fire-station should be so placed that the horses may safely be driven out at a good speed; for this purpose it is desirable to have a wide road in front of the station, and to set the station back a few feet from the footway.

Details of two important stations were given by Mr. Blashill, as follows:

BROMPTON FIRE-STATION.

This station was designed to accommodate the following men, horses and appliances: one engineer, ten married men, one married coachman, two horses, one steamer, one manual, one hose-cart.

The engine-room is in the centre of the building and measures 24 feet by 34 feet and is 13 feet 6 inches high.

The watch-room is on left of engine-room and measures 14 feet by 12 feet. The stable in this case opens into the yard. The coachman's quarters are on the ground floor to the right of the engine-room. The basement contains a large wash-house with stores of fuel for the use of the engine, and for use in the firemen's quarters, each man being supplied with a separate coal store.

There is one bath for the use of the firemen, as it is necessary that they should have a hot bath upon returning from a fire.

Upon the first, second, third and fourth floors are the quarters of the engineer and firemen. The usual size of each room is about 14 feet by 12 feet and 9 feet high.

The architect's estimate for the erection of this station was £6,600.

NEW CROSS STATION.

This is a superintendent's station of the largest class. It stands at the angle formed by two roads, and was built to accommodate one superintendent, one foreman, eight married men, eight single men, two coachmen, four horses, one steamer, one manual, one hose-cart, four escapes, one hose van, one long ladder on van.

The engine-room is 27 feet by 34 feet and 13 feet high, with additional space at the rear.

The watch-room and foreman's office are upon the right of the engine-room, and the recreation-room is upon the left.

The single men's mess-rooms and dormitory are placed behind the recreation-room, and there are quarters for two married coachmen at the rear.

The yard contains stores for fuel, etc., and shed for long ladder.

The basement contains a workshop with stores of various kinds.

Upon the first floor are the quarters of the superintendent and the foreman, and married firemen are accommodated upon this floor as well as the second and third floors. The rooms generally are about 14 feet by 13 feet 6 inches and 9 feet high.

There is a wash-house with drying-room over the long ladder shed in the yard.

The estimated cost of this station was £16,000.

[To be continued.]



THE RECENT EARTHQUAKE. — A SUDDEN CESSATION OF ELECTRIC-LIGHT AND POWER. — ELEVATING THE RAILROAD-TRACKS. — THE ANNUAL EXHIBITION OF AMERICAN ARTISTS. — ANNUAL REPORT OF THE ART INSTITUTE. — THE FIELD MEMORIAL ROOM. — ATTENDANCE AT MUSEUMS OF FINE ARTS. — THE LINCOLN MONUMENT AT SPRINGFIELD. — THE YERKES TELESCOPE.

THE last month, to vary the meteorological monotony arising from weeks and weeks of successive pleasant days, Chicago has indulged in a little earthquake. It occurred in the small hours of the night or, rather, morning, when the majority of the inhabitants were unconscious that their beds were shaking beneath them. Some of the ever-wakeful ones heard furniture rattle and saw lighter things tremble. In certain localities doors were seen to sway back and forth. The trembling sensation was felt very generally in all lightly-constructed buildings, and even in some heavy ones the shock was apparent, though as the higher stories were reached the trembling was changed to a swaying. In one, the Western Union Building, where the night-operators were at work, the large plate-glass windows are reported to have rattled ominously. The Auditorium, the Title and Trust, the Stock Exchange, Chamber of Commerce Building, the Fort Dearborn, the Reliance, the Woman's Temple and Masonic Temple were among those which felt no effect of the shock, while the Great Northern Hotel, the Association and the Columbus Memorial Buildings were among the few large structures in which the oscillations were perceptable. If we are to cultivate earthquakes as a regular thing, they will probably put a limit to the number of stories to be used in the large buildings of the city more effectually than any building ordinance could. This poorly-developed quake was productive of no damage in any part of the city or suburbs.

A curious accident happened only a few days ago in the late afternoon, which had it occurred at the time of the earthquake might have created wide-spread dismay and consternation. This little side-show sensation was the going out of fifty thousand incandescent lights in the down-town portions of the city. Many of the elevators in the hotels and big stores were run by the same power and, of course, these promptly ceased to work. Some of the cash-railroads in the retail stores were also run by the Edison Company's electricity, and as the boxes containing change were stopped in mid air, customers were obliged to leave in the dark minus their money. In the jewelry stores excitement prevailed, as it was at first thought to be a scheme for a wholesale robbery. The official reason for the cause of the trouble was a "derangement of some of the heaviest feeders" and if this electrical dyspepsia is likely to occur often, another lighting power would be more to be desired. The consulting engineer explained the trouble thus: "The lights are supplied from a net-work of triple wires, which are carried through the streets in wrought-iron pipes. These mains receive currents through underground cables called 'feeders.' Of these feeders there are thirty or more in the city district. The feeders take their current from a switch-board in the Adams Street main office and the switch-board gets its current from the power-house some distance away.

"The excavations made for the elevated roads along the courses of the mains caused settling of the bed on which the feeders rested.

"Electricity, like any other force, seeks the lines of least resistance, and at the places where the strain occurred leaks were established and finally short-circuits were established between two or more feeders through the ground. This at once increased the pressure on these feeders with the results that they 'blew out,' or melted. The next result was the 'blowing-out' or melting of the safety-fuses at the switch-board, thus incapacitating other feeders."

The passing of the Lake-front ordinance, before referred to in these letters, and the acceptance of the same by the Illinois Central Railroad Company, has during the last month made it an assured thing that this part of the town will, at last, no longer be the eyesore it has been heretofore. That the plans for its beautification as laid down by the Civic Federation will be carried out has not been decided, but the general laying-out of the place will permit of improvements on a grand scale, and will do more to create a fine feature for the city than almost any other change would. The city is working hard either for the depression or elevation of its railroad tracks. In fact, we are growing out of the village stage and as the fact is forced upon us, mammoth work has to be accomplished to give us the setting which belongs to a great city. The Chicago & Northwestern has already nearly two miles of its tracks on one of its divisions raised and the work is still continuing. The Rock Island and Lake Shore roads have one of the largest undertakings in elevating the tracks and have not time to accomplish things so rapidly as has the smaller undertaking. The work was begun a year ago last August and has progressed as far south as Thirty-eighth Street.

Thirteen bridges have been built across streets. These bridges are the kind technically known as "through-girder" bridges. They are of steel resting on abutments of masonry built upon concrete foundations. The subways at all streets over which the bridges pass have been lowered several feet on account of the trolley-cars which must pass under the bridges. The subways are paved with concrete and bricks and with the exception of Twenty-second Street, where a valuable brick building necessitated the leaving of the sidewalks at the original level, the walks have been placed even with the present level of the streets. Retaining-walls have been built at intervals when needed, rising in places as high as sixteen feet. All this work with the unloading of sand and gravel and laying of tracks has been accomplished without any interruption to traffic.

The Art Institute is at present holding its Eighth Annual Exhibition of oil painting and sculpture by American artists. The exhibition is full of interest, the work being generally fine and strong with less of that morbid affectation shown in the work of many of the European schools of to-day, while to see how far American artists have strayed from the old traditions of art, as they existed amongst us from ten to fifteen years ago even, you have only to look at some of the excellent examples here shown of the work of such men as Smillie, De Haas, the Morans, etc. Especially do we see in Smillie's fragrant breathing landscapes, in Francis Murphy's dreamy mistiness a change from the work of the new school of younger men who see things with different eyes. Each is well in its way, and one is glad one need not choose between the two. In the painting of the human figure, no manner can seem so excellent as that of the new man.

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Gari Melchers has four or five superb creations. One, entitled "The Family," aside from its artistic excellence, is fascinating in its realistic touches, pathos and humor going hand in hand as in real life, without affectation or desire to render themselves impressive. Especially is this noticeable in the picture, entitled "The Wedding," a splendidly painted canvas of a marriage in low life. The technique is fine and the humor of the scene irresistible, even to the tears of the women, which are supposed always to be shed on such occasions.

Mary MacMonnies has a very decorative panel, entitled "The Breeze," which is excellent in treatment, though one might take exception to the muscular power of the diaphanous creature. There certainly is a breeze and a stiff one, too.

One feature which is noticeable in this exhibition, as it is in many other collections of paintings from the brushes of our American artists of to-day, is the presence of the Indian as a favorite model. Being a purely American subject it is to be welcomed as a good feature, and doubly so, as it offers a degree of picturesqueness quite as apparent as the Holland or French peasant. The Indian seems especially to lend himself with a picturesque grace to the sculptor's treatment, and the day when the noble red man was chiefly given over to that branch of art which was devoted to the doorsteps of cigar stores seems to have passed by.

The display made by the sculptors in no way comes up to that made by the painters in the degree of its excellence. A bust by Lorado Taft, of Hamlin Garland, has more of the touch about it which one is looking for than almost any other work in the catalogue. Apropos of Mr. Garland, who is so anxious to bring out an American school of painting in all its strength of beauty, one is reminded of the report that a set of Chicago sculptors and painters are going to form a summer settlement at Bass Lake, Indiana. The country round about is reported attractive, and from the "Indianapolis Group," which has of late grown into the "Hoosier School," we may expect even better results than heretofore. Mr. Taft is contemplating building himself a lodge in this vast wilderness and joining the band, while three or four other artists already have their log-cabin studios under way.

The sixteenth annual report of the Art Institute has just been published, and it is interesting and encouraging to note the valuable acquisitions that it has gained during the last year. At the time of its completion, the Field Memorial Room, as being the work of the Tiffany Company and something really artistic in character, was mentioned in these letters. Seeing in the report the list of rare pictures which are in this room, one realizes more than ever that it was a princely gift. Three canvasses from the brush of Jules Breton head the list, one of them being the beautiful "Song of the Lark." Next to these come four by Cazin, while three Corots come close upon them. These pictures by the great masters are not mere poor examples which one feels ought to blush to bear the illustrious name, but excellent specimens of his best work. Daubigny, Detaille, Dupré, Fromentin, Millet, Rousseau, Troyon and Van Marcke add their names to list with works which, like those of Corot, are no discredit to the illustrious names they bear, making in all a wonderful little collection in point of quality.

The Society of the Antiquarians brings many additions to the rooms of the Institute in the shape of rare textiles, laces and jewelry. Indeed, the growth of such collections now found in this part of the Museum is most encouraging. Chicago, in fact, takes kindly and enthusiastically to the Institute, and the attendance during the last year as compared with the attendance at museums in other large cities is most encouraging, considering the immense proportion of the uneducated foreign element in our population. The Metropolitan Museum in New York with five free days had a showing of 511,881. The Academy of Fine Arts of Philadelphia footed up nearly 100.000 visitors with only two free days. Cincinnati's Art Museum with no free days had a showing of 31,471 visitors, while the Boston Art Museum with two free days showed a figure of 265,112. Chicago's figure was 489,127 with two and one-half free days.

One of our promising young women artists whose specialty seems to be fast growing to be the painting of the "Mother and the Child" has added one more leaf to her laurels, by a poster which she has just prepared for the "woman's edition" of one of the evening papers, whose profit was to go to the Children's Aid Society and the Maternity Hospital. The poster, which is successfully simple in treatment, as such things should be, is simply a group of a woman and a child, but is good in coloring and far from much of that affectation which characterizes much of this class of work. It would seem that such a composition might be a relief to collectors from things like the Gayety Girl and the whirl and twist of much of Beardsley's and Bradley's work, or even much of the *chic* wickedness of the work of men like Cheret.

Whether Lincoln Park is to have an addition to its works of art, or gain some more material for a future chamber of horrors, time alone will show. Dr. Benjamin Franklin is destined to watch the electric light and to be gazed upon with patriotic emotions by those who frequent this very popular pleasure-ground. Dr. Franklin is to stand nine feet high, and having been modelled by the sculptor, Richard H. Park, of this city, will be cast in bronze and placed on a granite pedestal. Dr. Franklin will be too large to be conveniently hidden, so let us hope for the best till we know the worst.

A so-called work of art which was imposed upon an unsuspecting public about twenty years ago is the Lincoln Monument at Springfield. In October, 1872, this monument was completed at a cost of $206,500, all the money coming as contributions from children. It is now simply falling to pieces as it was from the first a sham and disgrace — a huge brick pile covered with a three-inch veneer of granite — which has of late become so unsafe that a thorough inspection has been ordered. The monument has been turned over to the State and an appropriation has been made of $30,000 to put it in repair. The Governor, the State Treasurer and the State Superintendent of Instruction have been appointed as a Board of Trustees to care for it, and upon investigation this Board has found the monument such a wreck that it has advised that it be torn down, as all money spent in repairs would be simply thrown away. It is a comfort to think that this folly was perpetrated twenty years ago, and that there is a better understanding of matters artistic in America, and especially in the West, to-day than then, but such an outrage on good taste and decency makes one blush, and especially is it to be deplored that such a sham should have been erected in memory of a man whose crowning glory was his honest uprightness.

Apropos of the subjects of memorials, there is at present a most amusing discussion going on in Chicago over the to-be or not-to-be of memorial tablets in Jackson Park to mark the former resting-place of the great World's Fair buildings. To many it seems hard to imagine anything much more senseless or uninteresting than such tablets, and it is probable that the Park Commission will not encourage this final attempt to sentimentalize over the departed grandeur of ninety-three. It is somewhat surprising that one of the architects who helped create the beauty of the Fair should put himself on record as not in favor of the tablets, but as approving of the placing in the centre of the area covered by each building, of a "monumental Corinthian column, each on a pedestal." He further says, "This would give a straight row of four of these columns, marking the sites of the Transportation, Mines and Mining, Electricity and Manufactures Buildings, one in centre marking the Administration and two at the other side designating the sites of the Machinery and Agricultural Halls."

The whole plan seems most humorous, not to call it absolutely useless.

Another paltry three millions has been placed within the reach of the Chicago University. This is the largest sum ever pledged by one man for any educational purpose and makes a total of $7,425,000 given by Mr. Rockefeller to this institution. One million is given outright and unconditionally, while the remaining other two millions are given on condition that the University raise a similar sum between now and the year 1900. Most decidedly the Chicago University will not suffer for want of endowment, but it is a very different matter to start from the foundation with a library, museum, observatory, laboratory, etc., rather than that these things should grow as there was a demand for them. Time will be necessary to mellow these gifts, and that Mr. Rockefeller cannot give; we must wait for that.

The lenses for the wonderful Yerkes telescope, destined for the observatory of this institution, are now completed. The building is to be situated at Geneva Lake, one of Chicago's summer suburbs, as it affords high land as well as a clear atmosphere. The refractor is the largest in the world, the object-glass being forty inches. Three years have been necessary for the casting of suitable glasses for the two lenses, many attempts being made before one was produced without flaws. The lens for the Lick observatory was thirty-six inches in diameter, and as large lenses bend with their own weight every inch adds to the difficulty of casting them. Since the glass was obtained in perfect condition, it has taken three more years to make it into lenses, it being first rough ground into the required shape and then further reduced by polishing. This was not rough labor suited to any rough hand and so a skilled optician has performed the greater part of the work. An aluminium tool was used; the surface covered with wax.

It was in the yard of the Cambridge workshop that the lenses were put in place and tested by two astronomers. They have been found to be perfect, with no bubble or flaw, with all the curves conformed to equations worked out before the work on them was ever commenced. They are to be packed and made ready for shipment on a sleeping-car, as the springs of a sleeper would ensure a safer journey than those of an ordinary car. One lens is of flint and the other of crown glass, as the two kinds used together are said to correct one another's defects.

The observatory is nearing completion. The building is in the form of a Latin cross, with three domes and a meridian-room at the extremities. The dome for the telescope is at the long arm of the cross at the western end of the building. This dome is ninety feet in diameter, while the tube of the telescope is over sixty feet long. The floor and dome will be moved by electric motors. Two small telescopes will occupy the two other smaller domes. The building is of gray Roman brick and will probably be completed before next spring.

Mr. Gathman, of this city, has long had the belief that a sectional lens telescope was the only practical system on which to build large telescopes. Accordingly there is some talk of putting this theory to the test in an instrument for an observatory at Mount San Miguel, Cal. If this should be successful, the result would be a telescope five times as large as the one at the Lick observatory and four times the size of the Yerkes instrument.

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HEAT INSULATION.[1]

ONE of the curiosities of heat insulation is the fact that many good non-conductors resemble snow in general appearance, wool and cotton for example.

Among artificial non-conductors (I shall call these artificial non-conductors because they have to be manipulated before they become good non-conductors) asbestos fibre, mineral-wool, pure infusorial earth, lime, magnesia, pure wood-pulp and many others resemble snow in appearance. A white surface radiates less heat than most colors, hence, all other things being equal, white seems the preferable color, at least for the outside surface of a non-conductor of heat. . . .

We to-day build most of our residences with the full knowledge that with the thermometer at zero on the outside, it will be comparatively few minutes until it will be zero in the inside unless we have big fires. I believe it perfectly practicable, and much more economical in the end, to so construct houses that extremes can easily be avoided both winter and summer.

If architects will demand heat-insulating bricks for the inner portion of walls, and non-conducting plastering and windows, that will largely prevent the passage of heat, they can easily be furnished. Mineral-wool filling is very efficient in frame houses.

For preventing water-pipes from freezing, for insulating ammonia pipes, etc., in refrigerating plants, and for all similar low-temperature work, materials made of animal or vegetable fibres are, except in special cases, more efficient and satisfactory than any mineral substance. They are cheaper, easier to manipulate and being not so easily broken, they are at low temperatures, usually more permanent than mineral coverings. . . .

As already hinted, the first attempts at clothing steam-heated surfaces were by trying upon them the same kind of materials used in our clothing; it was soon found that when animal or vegetable fibre is applied direct on such surfaces the heat gradually chars and destroys them; this drove parties, both in this country and Europe, to attempt the use of mineral substances only, and many patents were taken out on various applications of clays, lime, etc. These were unsatisfactory, and the next step was the mixing of hair and vegetable substances with these minerals, and a large number of patents were taken out on these combinations.

These were a great improvement, but the fibre burned out, and the need of a fibre that would not burn caused resort to asbestos, and a half hundred or more patents were taken out in this country on different combinations of asbestos cement alone. The next step was the plan of John Ashcroft, of New York, of forming an air-space next to the hot surface; this, while it adds to the permanency of asbestos cement work, is not so good a non-conductor as is generally supposed; one inch of air being to an inch of hair-felt about as thirteen to one hundred. The principal office of air strata or cells is to interrupt the heat waves, and as small strata or cells as can be conceived of do this almost as efficiently as a much greater thickness of air.

To Mr. John C. Reed, of this city, now superintendent of the Standard Manufacturing Company, belongs the credit of, in 1875, first originating a practical sectional covering.

Almost all the coverings now being made by reputable manufacturers are good non-conductors, and the question of their relative non-conducting power is not nearly so important as is the question of permanency.

In addition to the reputed tests so largely advertised, experiments have been carried out in the engineering department of a number of our leading colleges, to determine the heat-insulating power of different classes of coverings, and the results announced have been very conflicting. Most of the tests have been by condensation, in substantially the same manner as follows: from the main pipe there branches a number of smaller pipes of the same size and length, each insulated with a different covering; the free end of each pipe is lower than the main, and the water is drained from each and weighed to determine the relative condensation in a specified time, the condensation in the main pipe being drained off separately. A carefully conducted test at the University of Michigan, under the direction of Professor Cooley, showed in favor of hair-felt. A similar test at our Pennsylvania State College showed mineral-wool to be the best non-conductor; and while I have not the report I have been credibly informed that a test at Cornell University showed wool-felt lined with asbestos paper in a favorable light. In some of these tests asbestos coverings have come out ahead, and magnesia in others.

Many of these tests have been conducted by gentlemen of reputation and honor, and were doubtless thoroughly honest. My experiments have shown that different pipes, all insulated with the same material, will at times show, by condensation tests, almost as varied results as the college tests have shown in pipes covered with different materials. More water may be carried from the main with the steam into some pipes than into others, and there are many things that may modify the result of such tests.

The average results of all these experiments, coupled with my continuous experience in the business these many years, and with twenty-five or thirty different varieties of material, convinces me that coverings can be made either of hair, wool, asbestos, wood-pulp, mineral-wool, infusorial earth, carbonate of magnesia, chalk, gypsum and compounds of these and other materials, that will all be so nearly alike in non-conducting power that a slight change of condition will turn the scale for or against either.

While there is question what particular covering may save a few heat units more than some other covering, there is no question about the great difference in loss from a bare boiler as compared with an insulated one.

The experiments of Peclet give the following as the conducting power per square foot of four materials, difference of temperature 1° Fahrenheit:

Copper.....	515.000 heat-units per hour.
Iron.....	233.000 " " " "
Ordinary stone.....	13.680 " " " "
Powdered chalk.....	.869 or less than one heat unit.

Hence, copper conducts 593 times as much heat as the chalk, iron 268 times as much, and even ordinary stone 15 times as much; hence, why should covering manufacturers quibble so much about a half-dozen heat units of difference when the difference between the covering and the iron steam-pipe is counted by hundreds of heat units; of course, poor non-conductors must not be used, as their necessary thickness will so increase the radiating surface as to neutralize their non-conducting power. I purposely used chalk in illustration, because it is very similar to the three materials that are being most largely used in combination with asbestos in making high-temperature coverings — these are infusorial earth, carbonate of magnesia and gypsum, each dependent for its strength largely upon the asbestos incorporated with it.

Porousness is one of the necessary qualities of good non-conductors, and this porousness necessarily tends to weakness, hence clothing for steam-pipes, like the clothing we wear, is liable to wear out. Means for counteracting this natural weakness and for making coverings permanent, is the one thing now needed. I am thoroughly convinced that there is only one practicable way to render coverings really permanent, and that is to strengthen them by reinforcing with iron. Iron can be so incorporated in the body of the covering that the atmosphere cannot reach it; the life of iron thus protected from the atmosphere is almost unlimited, and thus situated it will hold the covering in place indefinitely, making it really permanent.

I have known this a long while, but I have never been able to introduce it to the public on account of the largely increased cost; when I increase my price enough to justify this improvement, other parties get the contracts, but the paying of this additional cost is, in the end, the very best of economy, for coverings thus strengthened with iron will last five or six times as long as any of the coverings now in general use. The iron, being protected as indicated, need not be of sufficient thickness to affect the non-conducting qualities of the covering.

A high degree of permanency is attained by using one-inch thick of any of the well-known mineral coverings, and outside of this from a half-inch to an inch of wool-felt paper, made into solid tubes and securely fastened over the mineral coverings.

Felt-paper pipe-coverings, while excellent non-conductors, have heretofore failed of permanency because they were placed so near the hot pipes that they were gradually burned up. With an inch of good mineral insulation next to the pipe, this charing weakness of the felt paper is entirely overcome, and the paper tubes being very strong will, if properly fastened, hold the magnesia, asbestos, or other mineral covering in place two or three times as long as it would otherwise remain.

Less than an inch of mineral under the paper will not protect it, hence this plan means substantially two coverings and adds materially to the cost, and I do not believe it is possible to make heat-insulating coverings permanent without making the first cost more than it has heretofore been, but by increasing the cost they *can* be made permanent.

If, gentlemen, I have convinced you that it will pay to increase the first cost and make heat-insulating coverings permanent, I will have benefited all parties concerned.

[1] Extracts from a paper by Mr. J. A. McConnell read before the Engineer's Society of Western Pennsylvania, September 19, 1895.

THE ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE DUQUESNE CLUB-HOUSE, PITTSBURGH, PA. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

PLANS AND ELEVATION OF THE SAME.

HIGH SCHOOL, EMPORIA, KAS. MR. HARRY W. JONES, ARCHITECT, MINNEAPOLIS, MINN.

DESIGN FOR FREE PUBLIC LIBRARY AND INDUSTRIAL TRAINING SCHOOL, HOBOKEN, N. J. MR. JAMES ROSS, ARCHITECT, YONKERS, N. Y.

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THE OLD GOVERNOR BROOKS HOUSE, MEDFORD, MASS. MEASURED AND DRAWN BY MR. A. C. FERNALD, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

THE ENTRANCE HALL: DUQUESNE CLUB-HOUSE, PITTSBURGH, PA. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

LADIES' DINING-ROOM IN SAME BUILDING.

[Gelatine Print.]

MAIN DINING-ROOM AND ASSEMBLY-HALL IN THE SAME BUILDING.

[Gelatine Print.]

ENTRANCE FRONT, ST. KEVERNE, HARROW-ON-THE-HILL, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

GARDEN FRONT, ST. KEVERNE, HARROW-ON-THE-HILL, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

DESIGN FOR A CREMATORIUM. MESSRS. TARBOLTON & TUGWELL, ARCHITECTS.

THIS design was prepared for a sloping site, and the crematorium proper is therefore placed below. The coffin or asbestos shell rests on a marble bier in the centre of the chapel, and from this is carried to the chamber on the left, which is shut off completely by double self-closing doors. An attendant at the head of the secret stairs allows the body to slide direct into the furnace, where all fumes and gases are twice burned, rendered transparent and permitted to escape from the *flèche*. The ashes of the body are collected and at a given signal taken from the chamber. By placing the furnace below and shutting it off completely (by means of fireproof construction), the possibility of fumes entering the church is obviated. The mortuary is provided to meet the case of two bodies being present at one time, and the ecclesiastical character of the building is to permit of a religious service being performed.

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opened October 14.

Photographs of the Work of Burne-Jones: at Walter Kimball & Co.'s Gallery, 9 Park St.

Egyptian and Venetian Sketches, by Hamilton Emmons: at J. Eastman Chase's Gallery, 346 Boylston St., November 19 to December 3.

Drawings made for the "Ladies Home Journal": at the Boston Art Club, November 16 to 28.

Vinton's Portrait of Archbishop Williams: at Williams and Everett's Gallery, 190 Boylston St.

Annual Exhibition of the Boston Art Students Association: at the Grundmann Studios, Clarendon St., November 19 to 27.

BRIDGEPORT, CONN. — *Exhibition of Artistic Posters:* at the Public Library, November 9 to 30.

CHICAGO, ILL. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

NEW YORK, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Turner's "St. Mark's Place, Venice," also, Paintings by other English Artists: at the Avery Galleries, 368 Fifth Ave.

Loan Exhibition of Portraits: at the National Academy of Design, October 30 to December 4.

Sixth Annual Exhibition of the New York Water-color Club: at the Galleries of the American Fine-Arts Society, 215 West 57th St., November 11 to 23.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South, opens November 28.

PHILADELPHIA, PA. — *Autumn Exhibition of the Philadelphia Art Club:* opened November 18.

Works by Swedish Artists: at the Pennsylvania Academy of Fine Arts.

PITTSBURGH, PA. — *Loan Collection of Paintings:* at the Carnegie Library, during November.

NOTES AND CLIPPINGS

PORTCHESTER CASTLE. — It was not without emotion that we thus steamed through the wooden and the iron walls of England to reach the picturesque ruins of those old stone walls that stood in bold relief before us. These walls form a square enclosing rather more than eight acres of ground. Part of the moat and places outside the wall still remain, but a good deal of it has been swept away by the tide. They were built, for the most part, of flint stones set in frames and held together by hot cement, which, on cooling, became harder than stone. The small Norman gateway, which faces the water, seems to have been inserted into a larger Roman entrance. At another, the western entrance, there are traces in carved stone of a cock, a cat, an owl and a bat. Now these animals are all sacred to the goddess Minerva. They typify watchfulness, sagacity and foresight. Where, within the castle walls, now stands the church, stood a Roman temple, though there is no evidence to show to what god the temple was dedicated. Doubtless, the Druids had previously worshipped where the Romans built their temple. Thus for more than two thousand years has poor humanity, "the child of doubt," prayed on this spot, first according to one creed and then according to another creed. This church is well worth careful contemplation. We do not know the exact date of its construction, but we know that it was in existence in 1133, because at that date Henry I founded a priory of Augustine canons within the castle. Nothing of the priory now remains save the trace of the doors in the wall of the church by which the monks could enter without mixing with the general congregation. Also the church is built according to the style of the early Christian architects, which preceded the introduction into England of the pointed Gothic style. The western door is especially remarkable with its circular arch and mouldings. From four short pillars start several circles. They rest on Ionic or Composite capitals, and are thoroughly characteristic. Within the church there is an opaque marble font of great archæological interest, and some more very well-preserved specimens of Norman columns and arches. As a curiosity, there is the marble bust of Sir Thomas Cornwallis, Knight, groom-porter to Queen Elizabeth and James I, who died in 1618. The sculptor seems to have forestalled the colored muslin or other material with which flowers and other objects are made to-day, and that foretells the weather by changing color. He painted the face of the bust a sort of red, and this in such a manner that the paint was rendered permanent; but the color is more or less intense according to the dampness of the weather. Thus the good folks of the congregation have only to watch the complexion of the statue to tell whether it is going to rain. The citadel and the baronial residence are on the northwest angle of the fortress. The roofs have all disappeared save that which covers the citadel. These ruins are, however, very picturesque, and there is much to interest architect and archæologist. Windows and doorways, battered and shattered, some half filled up with earth, still retain much of their former ornamentation and beauty. Nature, by shielding a portion of the walls with an abundant growth of ivy, adds a rich, sombre, green coloring to the scene. Enough remains to give a very clear idea of the fortress, such as it used to be when it was one of the defences of the country. The importance of the place may be gathered from the fact that it was part of the dowry given in 1291 by King Edward, of England, to his wife, Margaret, the sister of Philip le Bel, of France. There is record of the various constables appointed to govern the castle by different kings of England; and it was at the priory, within the castle, that in 1445 Henry VI of England married Margaret of Anjou. In 1539, however, when monastic institutions were dissolved by Henry VIII, the estate around and belonging to the castle was granted or sold to a certain John White, Esq., and became by inheritance private property, first of the Whitehead family, then the Nortons, and finally the Thistlewaytes. Queen Elizabeth caused, however, the fortress to be repaired, held her Court there on several occasions, and her coat-of-arms is still preserved in the church. It was only after Elizabeth's reign that the castle itself, being judged no longer of any use for defensive purposes, became private property. The State has, however, on several occasions, hired the castle to convert it into a place of retention for prisoners of war. As many as 7,000 French prisoners have been confined in these antique buildings: the great Tallien himself was conveyed a prisoner to Portchester Castle when he was captured on returning from Napoleon's Egyptian campaign, as also Gen. Baraguay d'Hilliers, one of Napoleon III's most esteemed officers. In 1814 the castle ceased to be a military prison, and now it is the scene of many a picnic and pleasant holiday. Where Briton, Gaul, Celt, Roman, Saxon, Goth and Norman fought, where French and Dutch prisoners languished for years, now the children of numerous school treats come and play amid

"The gray but leafy walls, where ruin greenly dwells."

— *Adolphe Smith, in the Philadelphia Telegraph.*

PLACES FOR PRAYER. — The late Dean Stanley used to relate that a gentleman once called to tell him that he had been into the Abbey, and had knelt down to pray, when the verger had come up to him and told him he must not kneel there. On asking why not, the verger said: "Why, sir, if I was once to allow it, we should have them praying all over the place." This recalls the gentleman visiting a church, and asking the sexton whether people ever used it for private prayer, to which he replied: "I ketch'd two of 'em at it once." — *Argonaut.*

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Liquid Air in Commerce. — An interesting illustration of the rapidity with which purely scientific discoveries frequently become the starting point of new industries is furnished by the case of liquid air. It is no long time since liquid air was produced for the first time in quantities great enough to admit of its application for purposes of research; yet steps are already being taken to treat liquid air as an article of commerce and to turn it out upon a large scale. As in most cases of the kind, laboratory methods require modification to suit the needs of wholesale production. Patents are being taken out for machinery which, though constructed upon the principles of that used for purposes of research, will attain the desired end with greater directness and with the omission of several intermediate steps. The necessary reduction in temperature to the critical point of air has hitherto been affected by the successive employment of liquefied gases boiling at lower and lower points on the scale. But the final decrement of heat has been won by the cooling effect due to the rapid evaporation of the product itself. The new apparatus dispenses with the use of these intermediate cooling agents and relies entirely upon initial compression by powerful engines and subsequent partial expansion of the compressed air under carefully regulated condition. Most people probably have seen at one time or another the familiar lecture-room experiment of forcing a piston suddenly down a cylinder, and showing the ignition of a scrap of touch-paper by the heat thus produced. If while the compression is maintained the cylinder and its contained air be cooled to the original temperature, then, on suddenly withdrawing the piston and allowing the air to regain its original volume, there will be a fall of temperature corresponding to the rise on compression. If now the cooled air could be used to reduce the temperature of a second quantity of air before expansion, it is evident that, starting from the lower point than the first batch, the second would on expansion reach a lower point. This is the principle of the new liquid-air apparatus. A powerful engine compresses air, which is cooled as far as possible by ordinary refrigerating methods, and passed into a spirally coiled pipe, over 100 yards long. This pipe is enclosed in a second spiral. By means of a throttle-valve at the end of the inner spiral a certain proportion of the compressed air is allowed to expand in the space between it and the outer pipe. Thus the stream of compressed air from the pump is cooled by that portion which has been allowed to expand, and arrives at the throttle-valve in a colder state than the portion that preceded it. Consequently it reaches a still lower temperature on expansion, cooling yet more powerfully the advancing stream in the inner tube. By carrying this cumulative cooling effect sufficiently far, the circulating air is at last brought down to its critical point and liquefies, after which a continuous stream of liquid air is merely a question of engine power. It is impossible without the aid of diagrams to explain clearly how the continuity of the process is maintained, but the cycle of operations can be readily apprehended. There is compression, expansion in a closed chamber, and utilization of the cold thus produced to repeat the cycle from a lower initial temperature. The inventor, Herr Linde, who is a man of great experience in refrigerating machinery and methods, believes that a large demand will shortly arise for this most powerful of all refrigerators. In the meantime his apparatus produces with the greatest ease a substance for which there is already a large industrial demand — oxygen gas. During the process just described the air becomes steadily richer in oxygen until that gas forms some 70 per cent of the product. This relatively poor oxygen is sufficiently good for certain purposes, and it may be further purified from nitrogen if desired. The price of oxygen gas thus obtained compares favorably in respect of cost with that produced by the methods now in use. It would have been gratifying to have been able to announce that this commercial application of recent scientific ideas, so closely associated with the Royal Institution, had been made in England. But, unfortunately in this, as in so many other cases, it has been "made in Germany," where there is at present far more alertness and a far higher standard of technical knowledge than among ourselves. It is obvious from what has been said that this process is an affair of engineering far more than of chemistry. This remark applies to many of the most important and lucrative manufacturing processes of the day, and, unhappily, engineering chemistry, or chemical engineering, is just one of the things in which the Germans are conspicuously superior. — *London Times.*

M. Nenot, Member of the Academie des Beaux-Arts. — The Académie des Beaux-Arts has just elected M. Nenot, architect of the new Sorbonne, to a chair in the Section of Architecture, left vacant by the death of M. Ancelet. The honor was warmly disputed by four candidates, well known as distinguished architects, MM. Nenot, Guadet, Sédille and Dutert. Despite the first series of votes in favor of M. Guadet, the final result was carried off by M. Nenot by a majority of three votes. The new member of the Academy is young for the distinguished position which has been conferred upon him, being only 42 years of age. Entering the Ecole des Beaux-Arts at the age of 17, his studies and talent enabled him to carry off the Prix-de-Rome in 1877. In 1882 M. Nenot obtained the first prize in the competition opened by the Italian Government for a monument to Victor Emanuel; but the monument remained unexecuted owing, it is said, to the jealousy of the Italian Government against a Frenchman carrying off the first prize. But several months later this young architect, at the age of 29, obtained the first prize in the competition for the reconstruction of the Sorbonne, and was intrusted with the work of executing what is now one of the finest monuments at Paris. Unfortunately, a thoughtless youthful exploit at the commencement of his career was nearly the cause of spoiling his future, and was for a long time the source of much trouble to the rising architect. Returning from a hunting party, he thoughtlessly discharged his gun at an old cross on the border of the wood; an eye-witness accusing him of sacrilege was the cause of a condemnation to two months' imprisonment, his discharge from the army, and the loss of his military medal which he had won by exceptional deeds during the siege of Paris. The condemnation gave rise to much noise, and the Government, admitting it to be excessive, at length reduced the punishment to a simple fine; but the fact of the condemnation weighed heavy, and was for a long time the source of much disagreeableness and difficulty with the various administrations of fine arts. The young architect's courage and talent, however, at length won him great favor, and the Government decided to decorate him; but the condemnation of the Tribunal of Chartres remained an obstacle to this honor, the military rehabilitation not having been made. However, in 1885, a special order was made for rehabilitation, and M. Nenot was decorated with the Légion d'Honneur. — *Building News.*

The Phonograph and Defective Machinery. — An interesting instance of the diversified uses of which the phonograph is capable is afforded in a recent experience by the Knowles Steam Pump Works, of New York City. The company had put up one of its large pumps for the Ricks Water Company at its pumping station at Elk River, Cal. After several years of use something evidently went wrong with the pump, and in a letter of advice to the works regarding the trouble, which took the form of a phonograph cylinder, advantage was taken of the cylinder to record the sounds of the pump in running, precisely as the stethoscope is used by the physician in examining the action of the heart or lungs of the human body. The manager of the water company spoke into the phonograph receiver, describing the symptoms of the ailing pump, and then moved the receiver so that the pulsation of the pump would be recorded on the wax roll. When the cylinder is put into the machine in New York the voice of the Californian is heard first, giving in a clear, precise and distinct way the symptoms of the pump, and then he asks the listener to pay attention to the pump's action. The experiment proved absolutely successful, and by means of the roll the disease was diagnosed. The proper remedy was suggested, and the pump is running once more, and the time and expense of sending an expert from the works to California was saved. — *Philadelphia Record.*

The Working of the Oracle. — A guide at the Washington capitol makes this suggestion: "I ain't much on mythology," continued the old guide, "but here is a yarn I sometimes tell to a parcel of schoolma'ams when I guide 'em through the capitol. It don't take with the average run of brides and bridegrooms, which is our support during the season. They ain't interested in ancient history; they're smash up to date, right up to the hour. I've got on good authority that the old hall of Congress, what's now Statuary Hall, was copied from the sanctuary of one of the Greek oracles — probably the one at Delphi. This here oracle used to give out some very reliable information, which was just as good as gospel writ with the Greeks. A few of the old guides up here know a neat little trick about acoustics. They put a man on a certain stone a certain number of feet from the statue of Ethan Allen. Then they place another man in a certain position behind a pillar where the first man can't even get a glimpse of him. When the man that's standing behind the pillar begins to talk in a low voice the man on the stone will swear that it is the statue talkin'. It is simply a freak of the acoustics, but I reckon that's the way the oracles were worked." — *Washington Post.*

An Entire Roman House dug up. — Rome is really an inexhaustible mine to the lover of antiquity. Almost every day, says our correspondent there, new discoveries are announced, while almost any spot repays excavation. Lately, in Via della Sette Sale, near the Colosseum, and next to the ruins of the Baths of Titus, while digging was being carried on at some foundations, there came to light, at the depth of twenty-six feet, an entire Roman house with black and white mosaic floors, and with some remains of the subdued polychrome decoration for which the house of Livia on the Palatine is celebrated. The walls are frescoed with garlands of flowers, with cocks in the centre. It seems to be the remains of a residence of the Praefectus urbis, the situation of which corresponds to the locality in which the ruins have been discovered. Almost at the same time, in the vicinity of the Piazza della Carrette, near the Roman Forum, there have been unearthed, sixteen feet deep, some private baths of considerable extent, with passages paved with large pieces of basalt, similar to those of the antique Via Sacra. — *London Daily News.*

Tiberius Pleasure Galley. — News comes from Nemi, near Albano, that by private enterprise two divers are exploring the bottom of the Lake of Nemi, where lies the pleasure galley which served as a retreat for the Emperor of Tiberius during his orgies. Our Rome correspondent says: "In the fifteenth century Cardinal Colonna, owner of the Castle of Nemi, now the property of the Orsini, tried to recover the galley, but without success. At the beginning of our century, the effort was again made and some large bronze nails were brought up from the lake. The present explorers have seen the galley, called the Palace of Tiberius, at about eighty feet from the bank, and, although damaged by age, it still appears much decorated with bronze, and mosaics. Heads of bronze, a wolf and lion, targets adorned with inscriptions, rings for docks, and other objects of immense archæological value have already come to light." — *London Daily News.*

Proposed Disenterment of the Sculptor David. — David, the painter's body, lies buried in Brussels, where he was obliged to take refuge after the fall of Napoleon on account of his share in the Reign of Terror. It is proposed now to transfer the body to Paris, where his heart is already buried. — *Exchange.*

Injury to Metz Cathedral. — The hurricane of the night of October 4 is said to have wrought great damage to the Cathedral of Metz. The sculptures were much injured, the pavement being strewn with fragments, and a considerable part of the copper roofing of the nave was torn off. — *Exchange.*

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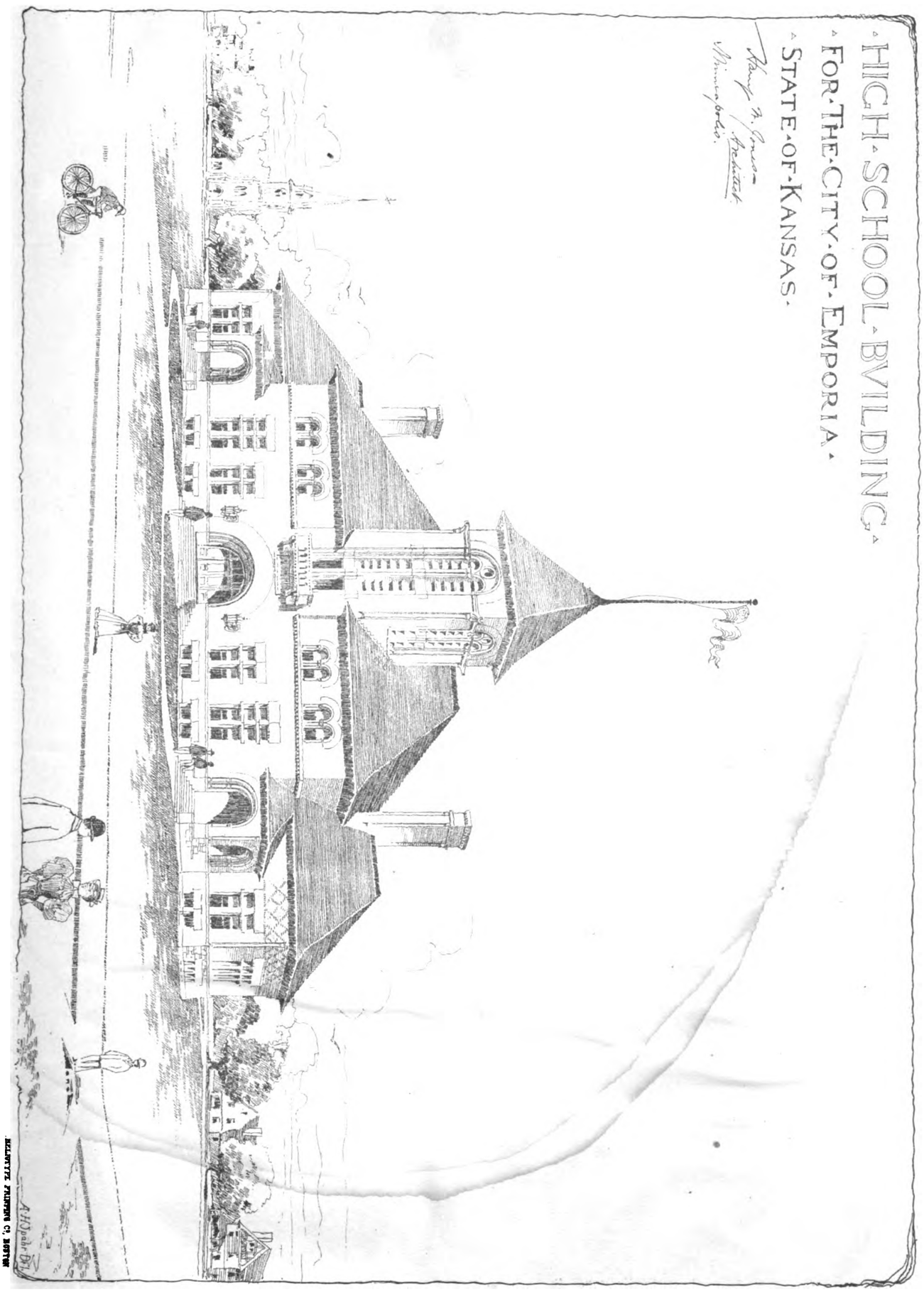
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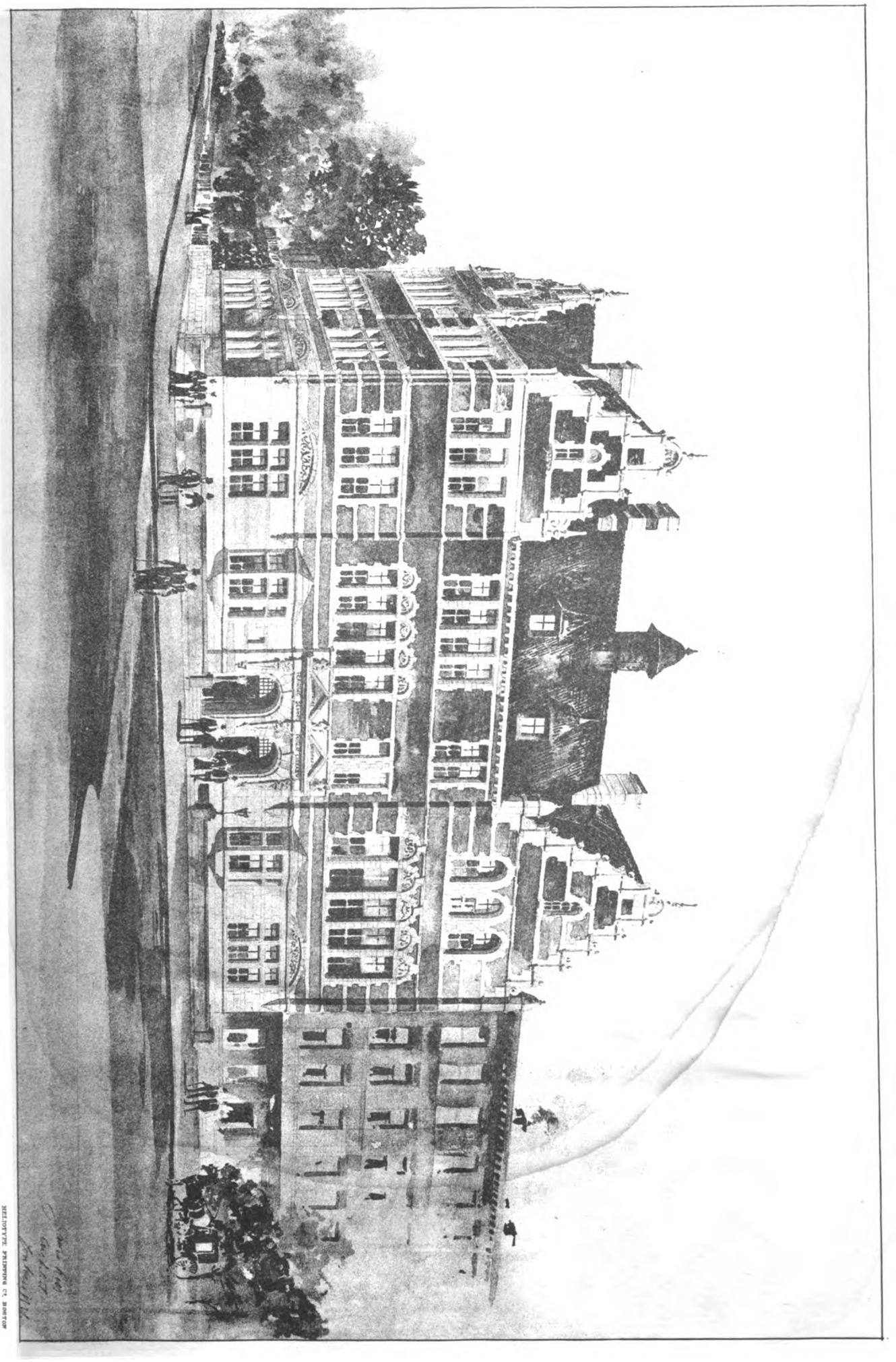
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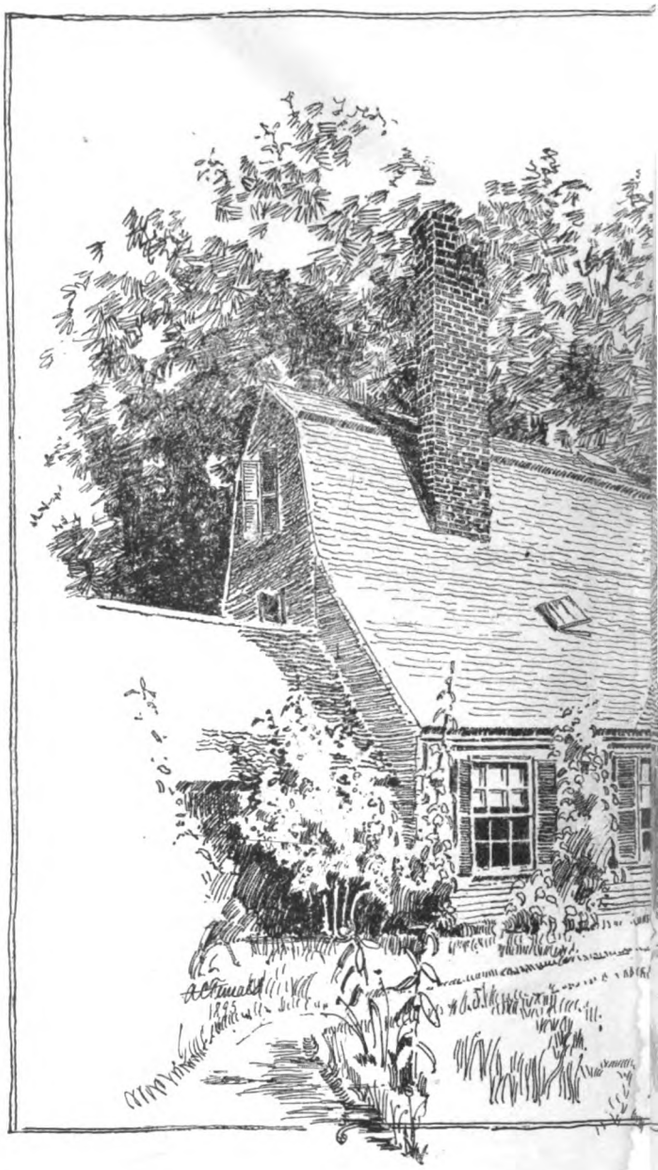
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Old Gov. Brooks House
Medford
1800





East Elevation

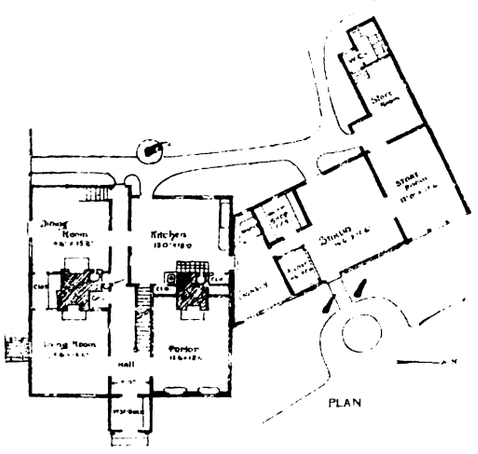
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THE AMERICAN ARCHITECT & BUILDING NEWS CO



Old Gov. Brook's House
Medford





South Elevation

Brook's House
Mass
1764
BY ALBERT C. FENNALD
SCALE

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NOVEMBER 30, 1895.

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ONE of the most melancholy events that we have ever been obliged to record is the death of the venerable Calvert Vaux, which occurred last week, in some manner not yet explained, his body having been found floating in the water at Bath Beach, N. Y., not far from the house of his son. To the older generation of architects, and persons of cultivated taste, the name of Calvert Vaux had been familiar for a long period; and it is difficult to realize that the man who shared with Downing the labor of preaching for the first time in this country the gospel of taste and beauty in connection with country-houses and country-estates would not have completed his seventy-first year until next month. Mr. Vaux was born in London, December 20, 1824. He was educated at the Merchant Tailors' School, and afterwards studied architecture under Lewis N. Cottingham, a noted practitioner in his day. At the age of twenty-four, he was selected by the famous Andrew Jackson Downing, the first of American landscape gardeners, and the founder of a school whose greatness is yet only half-appreciated, to assume the architectural part of the work which Downing had undertaken to do. From that time, until the death of the senior partner, the firm of Downing & Vaux stood at the head of the profession of landscape gardening and rural architecture in this country. They were employed by the United States Government to lay out the grounds of the Capitol and the Smithsonian Institution, at Washington, and executed countless private commissions in all parts of the country. When the project of creating a great park for New York was formed, competitive designs were invited, and Mr. Vaux, in connection with Mr. Olmsted, prepared the plan which was adopted and carried out. Mr. Vaux, whose part in the work was more particularly the architectural portion, retained his connection with the Central Park, as consulting landscape architect to the Department of Public Parks of New York, to the end of his life, the only serious attempt at superseding him having been defeated, a year or so ago, by the loyalty of Mr. Olmsted, who, when it was proposed to place him in sole charge of certain work for the Park Department, refused to have anything to do with it except as Mr. Vaux's coadjutor. By the time that the New York Park scheme was definitely settled, the people of Brooklyn desired to have a park also, and Vaux, Olmsted & Co. made designs, which were accepted and carried out, for the Prospect Park for that city. Later, the two artists designed the parks of Chicago and Buffalo, and the State Reservation at Niagara Falls, besides the Riverside and Morningside Parks in New York. Beside his more strictly landscape work, Mr. Vaux designed and carried out many buildings, public and private, in various parts of the country. On the dissolution of the formal connection between him and Mr. Olmsted, he associated with himself Mr. Withers, whose distinction as a designer of churches is well known to the profession; and afterwards Mr. Radford. Both Mr. Withers and Mr. Radford were Englishmen, and Mr. Vaux himself never forgot his own country or his compatriots. Of late years his son, Mr. Downing Vaux, and Mr. Samuel Parsons, Jr., have been associated with him. Personally, Mr. Vaux was extremely energetic and industrious, and devoted to his profession. Many of our readers must be familiar with his book, "*Villas and Cottages*," which formed a most satisfactory sequel to the renowned Downing books. Although he kept at work, his health had been feeble for some time, and it is supposed that in some momentary unconsciousness he fell from one of the piers near his son's house into the water.

FIRE AND WATER comments on the Manhattan Bank fire in New York, drawing conclusions very similar to our own, — that no one whose opinion is of any value can regard a structure of steel and brick of the modern sort, with slender supports and large openings, as anything but a more or less successful attempt at a building in which a fire, breaking out inside of it, can generally be confined to the room in which it originates. The principal reason for the comparatively feeble resistance of steel and iron structures to the heat of a fire is, it thinks, to be found in the fact that the metal beams and columns warp and twist when heated, throwing off their rigid casing, and destroying the walls and flooring of masonry in which they are inclosed. Like most of the suggestions which *Fire and Water* makes on such subjects, this one is worthy of thoughtful consideration. The newspaper reporters generally inform us that it is the "expansion" of the beams and columns which throws down the so-called "fireproof" buildings in case of a conflagration. This is manifestly absurd, as the masonry would expand so nearly at the same rate as the metal that there would be very little tendency to dislocation; but the warping, which takes place in structural steel under a comparatively slight degree of heat, is a very different affair. Every architect who has had much experience with structural steel knows that the pieces are rarely quite straight when delivered from the mill; and that punching, probably by releasing certain internal strains, usually causes angle-irons, or other pieces with a large number of rivet-holes in them, to bend still more; so that they must be forced into line with drift-pins and bolts before they can be riveted. Heating, again, often develops twists of various kinds; and it may well be imagined that a violent heat, applied to one side, or to a limited space, as would occur in the case of a fire, would cause such serious deformations as to throw off the fireproof casing, which is not often very firmly held to the metal. In view of the probability that some such action is the main source of danger where fires occur in so-called fireproof buildings, it is important to know whether it cannot be prevented, or its effects made less dangerous. Considering the great improvement made within the last decade in the manufacture of structural steel, which, from an uncertain, if not dangerous building-material, has become more uniform and reliable than iron, it is not too much to expect that American metallurgy may hereafter produce a steel as much better than that of the present day as the latter is better than that of 1885; but there is another direction in which improvement in structural methods may be made. We, like many other architects, have long regarded the present system of casing an elastic metal skeleton with a rigid covering of small pieces of brick, stone or terra-cotta, as illogical and unscientific. Of course, it has been imposed upon architects by the necessity, which is felt at the beginning of every transitional period, of making the new buildings look, on the outside, like the old ones, in order to avoid shocking the prejudices of the public; but all our professional readers know that, in modern structures, the masonry casing, whose bond, even under the most favorable circumstances, is cut to pieces by the steel-work inside, is, as a rule, a mere shell, from four to eight inches thick, clinging feebly, by means of anchors, to the steel structure that supports it, and ready to fall off by its own weight if any movement of the metal should incline it a little from its vertical position.

LOOKED at as a piece of scientific induction, this system is manifestly unsatisfactory. The essence of a riveted steel structure is elasticity and toughness. A railroad bridge is expected to deflect some inches under the weight of a heavy

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train, and to recover itself after the train has passed; and, so long as the elastic limit of its materials is not exceeded, the integrity of the structure is not impaired. A modern steel building is put together in precisely the same way as a bridge, and the strains in it are provided for in just the same manner, yet an engineer who should decorate a railroad bridge with a casing of terra-cotta blocks, which would fall off under a deflection or sway far within the safe limit, would be looked upon as a fool; while an architect who proposed anything else than such materials for casing the very similar structures under his care would now be regarded as even more eccentric. A few years hence, as we believe, public opinion will change on this point; and elastic steel buildings will be decorated and protected by a covering as elastic as themselves, — one which will cling to them under all circumstances, which neither fire, water, warping, gravitation nor expansion can remove. A steel structure so covered will bear little resemblance to the Parthenon, or the Pitti Palace, or Giotto's Campanile, or anything at Ragusa, and the critics will have hard work in bringing their minds to bear upon it; but it seems to us that a system of this sort is the inevitable solution of the problem upon which architects, owners, underwriters and fire-engineers are now working — the invention of the best possible construction for city buildings on high-priced land. Concerning the nature of the elastic, fire-resisting and beautiful covering which is to clothe the steel skeletons of our future business buildings as the skin and muscles cover and protect our own bony structure, we will not venture any predictions. Our own observations have suggested that a wrapping of metal lath, plastered with cement, followed by an ornamental casing of copper, riveted on, and the whole grouted solid with lime and cement, might answer for the walls and columns, with a somewhat similar construction of wire-netting and concrete for the floors; but these details would be evolved by circumstances.

IT is with no small pleasure that we find ourselves appealed to for a word in support of the remonstrance which the artists, students of history and other thoughtful and sensible people are making in New Orleans against the destruction of the Cabildo, or Government House, once occupied by the Spanish Viceroy, who ruled over a territory which then comprised one-third of the present area of the United States, to make room for a new court-house. As a practical matter, the remonstrants say that the site, which is in the old quarter of the town, at some distance from the modern business section, is unsuitable for a court-house for the trial of civil cases; but that is a trifling consideration in comparison with the violence to the noblest of human sentiments which would be involved in the needless destruction of a building in which the great and romantic history of Louisiana and New Orleans is centred. Mr. Ruskin once wrote that he had often been invited to come to America, but that he had never been able to make up his mind to visit a country so miserable as to possess no castles. It is true that we have no castles, with their associations of violence and cruelty, but we have still many buildings connected with the history of the pure patriotism and heroic struggles through which was founded the greatest and freest commonwealth that the world has ever seen; and no lover of liberty would exchange Philadelphia's Independence Hall, or Boston's Old State-house, or the ruins of the Texan Alamo, for all the castles in Europe. Every year makes the historical buildings that we still possess more precious, and Americans, however lightly they may value the things which have so long been familiar to them, should not forget that they are the custodians, in behalf of the civilized world, of objects which centuries hence will be of as much interest to foreigners, as memorials of the English, Dutch, French and Spanish occupation of this country, as the Tower of London, or the tombs of the Norman kings, in England, or the Carlovingian monuments in France or Germany, or the ruins on the Palatine hill in Rome, are to us.

MR. B. TOMPKINS, of Pidmore, Chippenham, Wiltshire, England, writes to the *British Architect*, to mention a work of his, entitled "*The Theory of Water Finding and Metals*," just published and for sale by the author at one shilling per copy, and to give a little explanation of the details of water-finding by means of the divining-rod. As Mr. Tompkins says, there is much scepticism among intelligent people in regard to the operations of the divining-rod; and, as an evidence of a disinclination to credit the existence of phenomena which cannot be explained, he thinks this scepticism is laudable; but, according to his experience, the phenomena are so plain that they must be accepted as facts, whether we can at present explain them or not. As to the action of the divining-rod in his hands, he says that, when he is employed to find water, he simply walks over the ground to be investigated, holding in his hands the branches of a forked twig of white-thorn or hazel. If there is no water at an available depth, the rod does not move; but if there is a spring, or underground stream, he feels, in passing over it, a steady pressure on him, drawing him toward the earth, at the same time that the twig inclines in the direction of the spring. Following the indication of the rod, he reaches the point where the accumulation of underground water is largest, or nearest the surface; and here he finds the sensation of pressure on him stronger than before, while the twig, first standing upright, then inverts itself, with such force that, if he holds the ends of the branches firmly, they will be broken by the effort of the main stem to turn over and point downward. On testing the ground pointed out in this way, water has, in his experience, always been found.

WITHOUT saying that we entirely believe in the operation of the hazel rod, it is not necessary to assume that the holder of it must be possessed of necromantic powers in order to use it successfully. Nothing is more certain than that natural forces are in constant operation around us, which our senses are not delicate enough to perceive. The most rational theory that has been put forward to account for the unerring instinct by which bees, birds and larger animals find their way straight home from a distance, perhaps, of many hundred miles, suggests that the guide by which they steer their course is to be found in the magnetic currents which are constantly circulating around the earth in a north and south direction. The senses of animals are, in many respects, far more acute than those of men; and there is nothing incredible in the idea that birds and bees may feel these magnetic currents in such a way that they can use them as a compass, and steer, with their help, to whatever quarter they desire. Moreover, if animals can feel magnetic currents, there is no reason why men should not feel them also. That they do not feel them may be simply the result of want of attention to them. People soon lose the perception of things that they care nothing about; and, on the contrary, they rapidly gain in delicacy of perception in matters that interest them; so that it is by no means inconceivable that a person who walked day after day about the fields, with close attention to his own feelings, to see whether he perceived any unusual sensation at certain points, might learn to distinguish by feeling the influence which a good conductor of electricity, like a spring or underground stream, would undoubtedly have upon the electrical condition of the atmosphere above it. Every one knows the state of nervous tension which oppresses people before a thunder-storm, or any other violent atmospheric change; and, by paying attention to such feelings, their momentary recurrence, under certain circumstances, might easily be noted, and connected with the circumstances. In this way, it would not be very difficult to account for Mr. Tompkins's sensation of "pressure" in the vicinity of an underground spring; but the sensitiveness of the witch-hazel twig is not so easily explained. Here, however, the personal element does not enter into the question, and there ought to be no difficulty in arranging such a twig on a pivot, with a graduated arc and a balance spring, and conveying it to some known water-bearing tract, for the purpose of studying the force and direction of such attraction as might be exerted upon it. According to the testimony of Mr. Tompkins, and many other people, the force, whatever it may be, is great enough to break the twig, if it is not free to move. Such a force as this must be easy to measure, and the results of accurate measurements of it would be important. If the rod will only turn when held in the hands of one of the initiated, let the initiated attend at the test, and assist in the determination. There would be no difficulty about this, and it is really time that the divining-rod discovery, or delusion, should be brought out of the province of superstition, and made to show whether there is anything in it of scientific value. It should not be forgotten, also, that the real witch-hazel rod is reputed to point to subterraneous gold, as well as water; and its powers are quite as well worthy of investigation in this direction as in the other.

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ART IN THE MODERN CHURCH.[1] — VII.

THE CHURCH TOWER.

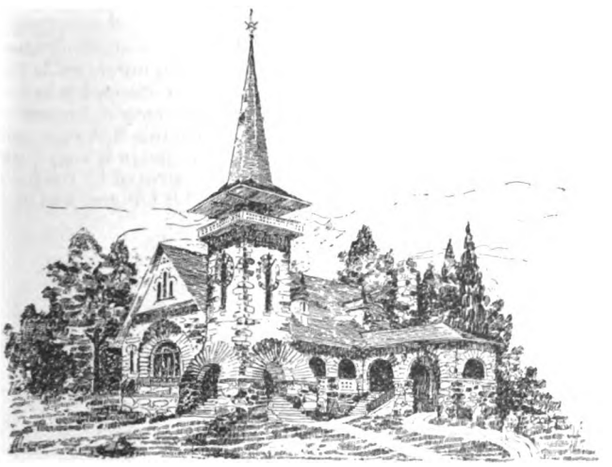


Fig. 37.

THE tower is the chief dependence of the modern architect for giving a distinguishing and churchly aspect to his church building. He employs towers in other sorts of edifices, but the church is almost the only one in which its use has been practically agreed upon as essential. The tower has, therefore, a greater importance in church design than any other feature. Unfortunately this importance is not supported by the beauty of the designs that are produced under the modern system. It would appear that, if the tower must be the chief part of the church building — chief in being the most distinguishing and conspicuous feature — a very great excellence might be obtained for it. Our architects produce many very charming country houses because they are the form of work with which they are most familiar, and which most frequently offers itself for their professional treatment. If a tower is so important in the church building that scarce a church is built without one or more, it is not unreasonable to expect considerable success in their design, if, indeed, absolute supremacy is not obtained.

But every one who has studied modern church architecture is fully aware that this is not the case. The tower of the church is quite as likely to be as unsuccessful as the building itself, as numberless examples abundantly and sadly prove. The utmost our architects, as a whole, have accomplished with the tower is to make it picturesque.

But this, as we have seen, and as countless examples show, has nothing to do with religious design, though as churches are now built it appears to be considered as necessary to make the tower picturesque as any other part. This, of course, is consistent, since a picturesque design must be so in all its parts: it cannot be formed of diverse elements, and so long as this quality dominates American church architecture just so long may we expect towers that are picturesque, or which pretend to be — unhappily, not always the same thing.

Now the tower was in its origin a defensive structure, a lofty

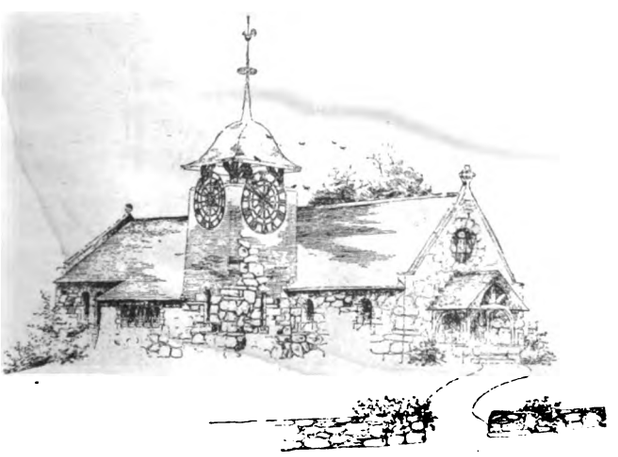


Fig. 38.

building wherein one might find refuge from an assailant from without, and from whence one might successfully contend against a foe. The earliest church towers in Italy seem to suggest that this primitive meaning was retained in the early ages of Christianity, but this warlike and ungodly association disappeared with the progress of the church and with the development of Christian ideas. The church tower, however, remained, but instead of marking a formal



Fig. 39.

protest against the assaults of the outsider, it became a symbol and beacon of the church, telling the faithful as they approached the city that below it was the house of God, whose strength, security, beauty, was expressed in its tower as in the building of which it formed a part. It was under such a system that the church tower received its marvellous development in the Middle Ages, when it reached a perfection of form, a splendor of design and a wealth of art and beauty it never had before nor since. Set up to mark the loftiest and most precious possession of humanity — the idea of the personal God — it shows in a very marked and striking manner the heights to which architectural composition can be carried when it is animated by the most exalted feeling.

We have lost all that, as we have lost many another thing in our modern church design. Our churches have lost their godliness of aspect, and our towers, though still pointing heavenward, are mere ornaments, choice pieces of *bric-à-brac* as it were, stuck on to designs that, as likely as not, are sadly in need of brightening up. It is hardly possible to imagine a more complete degeneration than that which this once noble feature has experienced, and its downfall

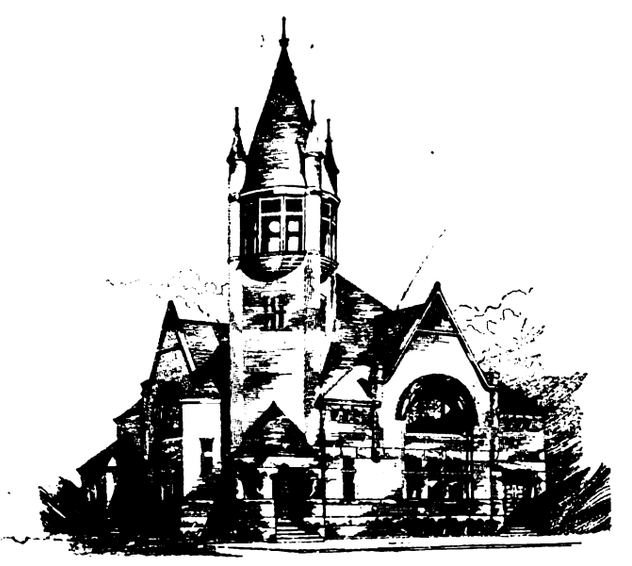


Fig. 40.

has been the greater since, not being essential to the uses of the church, it has been thought so purely ornamental that every other possibility or meaning has been utterly forgotten.

We have already seen a number of church towers to which no Christian significance can be attached. They have not been added to the design because they expressed a Christian thought or illustrated a Christian virtue. In many of them no thought of dignity

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1038, page 77.

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has been hinted at. A general "prettiness" characterizes most of them; they are attempted ornaments, if not ornamental. It need hardly be said that towers designed as purely ornamental appendages to the church building must be very different in effect from those which aim to express the majesty of the church, or which set



Fig. 41.

forth the glory of God. When the architect puts away from himself the idea of godliness in building, his designs become purely secular products that might be classed as pagan if the idea of religion had not been entirely excluded from them at the outset. So our church towers, as a rule, simply illustrate so many individual ideas of the picturesque in building, and the more closely they approximate the picturesque, the better their misguided authors seem pleased.

In the church shown in Figure 28 we saw an instance of the exaggerated picturesqueness in church towers. A design somewhat similar to it is seen in Figure 37, a sketch for a suburban chapel, a design submitted in an architectural sketch-club competition. This is only a student's design, whereat we may rejoice greatly, since it has not been built, but that a young architect should imagine a design



Fig. 42.

like this to be suitable for a church is quite as alarming an indication of the general ideas concerning churches prevalent in this country as any actual building. The tower is certainly most eccentric, with its base of inclined arches, its narrow windows cut into the clock-face, its balcony and windmill head-piece. Its author has tried to produce a picturesque tower, and he has succeeded so far as to have drawn a design that does not resemble in the least any church tower previously designed, and which certainly has no message of Christianity to convey to those who may be privileged to gaze upon it.

Figure 38, a proposed country church, shows a less startling tower than the foregoing, but it is certainly not a religious tower, while it is difficult not to wonder why the stonework was stopped where it is, and why the curved cover was hoisted above onto a framework of wood. It is touches of meaningless fancy like this that so greatly injure our church architecture. This particular design is simple and not ineffective, but its sobriety is deliberately destroyed by the fanciful touches at the top of the tower. Thinking his business was to do



Fig. 43.

something with a note of the picturesque in it, the author took away all the religious character he had put into his design, not deliberately, perhaps, but as completely as though deliberately and of set purpose.

Figures 39, 40, 41, 42 illustrate four church towers which show us, as clearly as drawings can show, how very harmful such a feature may become in unguided hands: how godless it may seem when shorn of its religious character, how unnecessary to the church building, when it has lost its churchly significance; they really represent

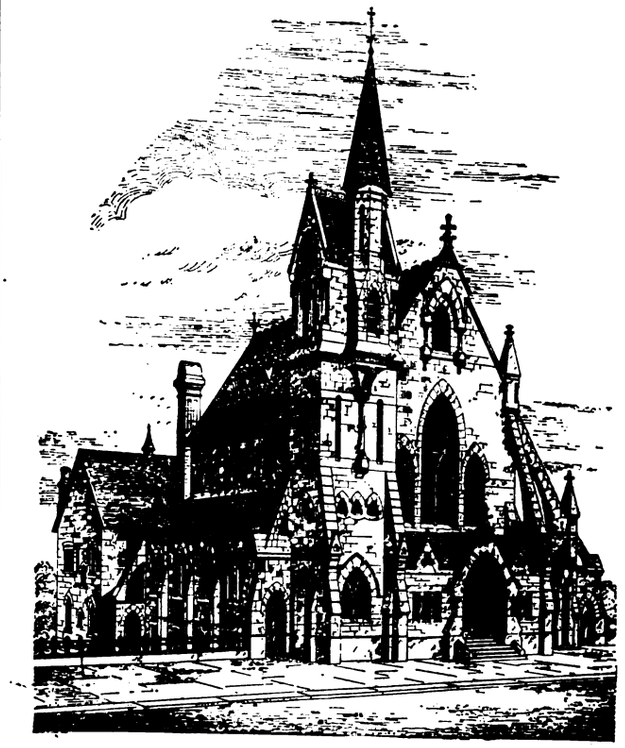


Fig. 44.

a considerable geographical extent, and may be taken as types of average churches. There is nothing in common in these towers save their top-pieces which have a certain family likeness, though it is not probable that any one inspired the other. They are not unfair types of the hundreds of church towers annually built in America —

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thoughtless, meaningless, stupid structures, with little beauty and with no purpose. Without art to commend them, without beauty, conferring no ornamental quality upon the structure to which they are attached, they nevertheless, for some strange reason, give a churchly air to the building in the eyes of their creators, and of our

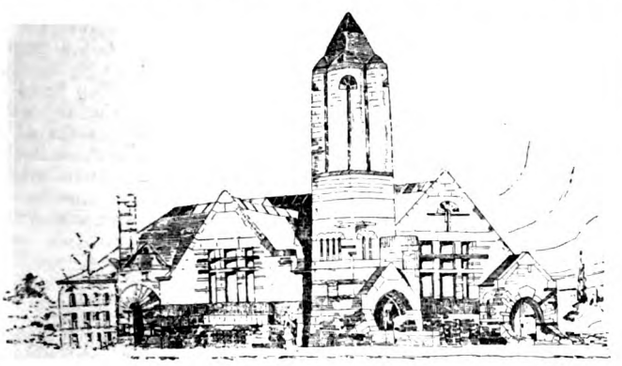


Fig. 45.

good people generally. Apparently it is the idea of a tower that inspires respect and admiration in the modern mind. It cannot, if we judge from the examples before us, be their beauty nor their art. We are, therefore, reduced to the primitive idea of a heap of stone or of building-material, which still remains a heap, though its arrangement be more or less orderly, or approximate, as in the present examples, architectural form.

The church shown in Figure 43 might be considered from the effect of its towers, since the three of them form a dominating group. The central tower is manifestly a lantern and nothing more; it simply and naturally expresses what it is. No great fault can be found with it, save that, in the drawing, it appears too large and heavy for the building, while certainly much of the detail with which it is enriched will be lost in its position. Thus even in so simple a design the architect created two difficulties without solving either of them. The façade towers are not happy in their effect. The idea of a tall, stately, simple tower, capped with a rich frieze of ornament, with a crowning member above, is good in itself, but not as carried out here. The towers are intended solely as ornaments, yet they fail in that as completely as they fail to indicate a feeling of Christian reverence.

Figure 44 illustrates a Presbyterian church. It was built about fifteen years ago, and is, therefore, older than the designs we have been studying; yet its tower is a melancholy example of an architectural form not to be copied again, and which was unhappily invented for the present structure. The spirit that suggested this tower — a desire for ornamental effect — inspires most of the church towers of the present day. We may not build quite in this form, but the idea, the end aimed at, is the same. Our architects have improved their methods of architectural practice in the last decade and a half, they have given us purer detail and more careful, perhaps more scholarly, compositions, but we get little more of Christianity in our architecture.

If this tower exhibits a past type of the modern church tower, that shown in Figure 45 is surely of a very recent and up-to-date type. That we should have fashions in church towers is more unreasonable than fashions in the mode of dressing the hair of women. For one



Fig. 46.

is permanent and the other is temporary, and the one will last after the other has fallen out and wasted to decay. Yet the types of church tower in favor with us seems to vary and change with time in as unreasoning a way as the cut of a skirt or the twist of the hair. Sometimes we delude ourselves so far as to think that the strange things we do are expressive of our very modern age. Such, perhaps, might be claimed of the design before us, since no other epoch of time can boast a product like this. But if the tower is unlike any other tower, its modernity consists solely in this departure from established good usage. No other age could have produced a tower

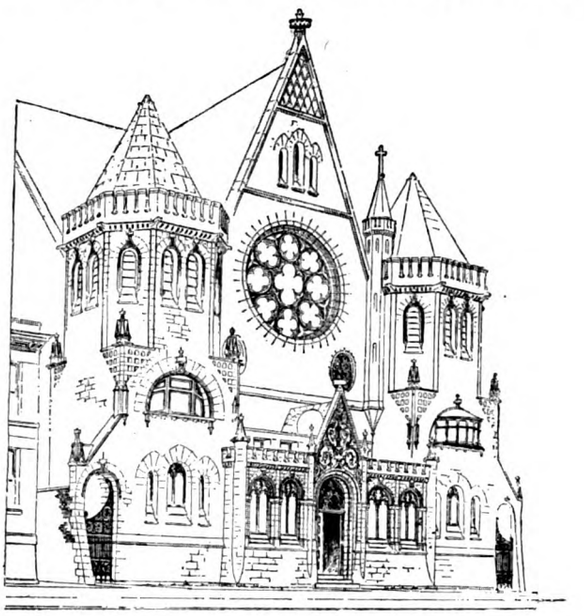


Fig. 47.

like this, because in no other period of Christian time would so extraordinary a design have been tolerated. It does not correspond to any modern feeling, it does not express a modern conception of Christianity, it is put to no modern uses; only its strangeness of aspect gives it a modern flavor, yet being part of a Christian building it fails utterly in meeting the requirements of Christian art.

Yet is this true? Is this tower worse than any other tower? Is it the one structure to be singled out among thousands to be held up as the most unchurchly and the most un-Christian of them all? The towers of the church shown in Figure 46 and the two towers of the church shown in Figure 47, with most of the others we have seen, give negative replies to these questions. Not one of these is worse than another in a generic sense, since all are types of average buildings, whose unchurchly quality is most apparent when they are brought together for examination from the Christian point-of-view. It is just because such average work as these is tolerated, erected, aye, delighted in — since they are constantly being built — that the standard of our church architecture is so low, and the quality of its Christianity so slight. The Christianity of our modern American churches, in truth, is confined to the doctrines taught within them; the structures themselves tell us little of it.

In the Figure 47 we have a frontage of ample width, in which a great deal of room is consumed by the short clumsy towers which flank the centre. Apparently these towers are not intended to be carried higher, and thus they become purely ornamental appendages intended to give more or less beauty to the structure. How successful they are in this respect I may well leave others to decide, but

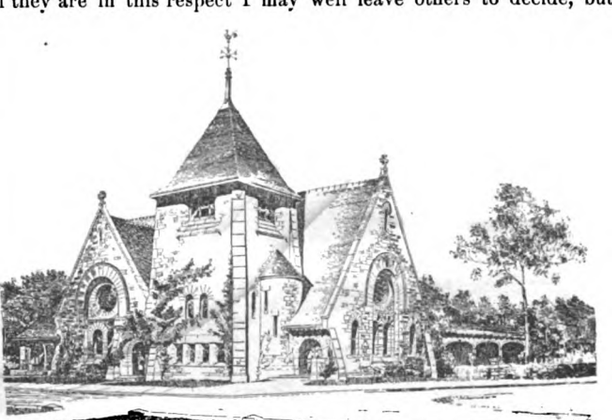


Fig. 48.

their un-Christian character will not be debated. They add nothing to the religious appearance of this building, and their large size, in comparison with the rest of the front, gives them an importance to which neither their art nor their utility entitles them.

These towers are examples of the unfortunate result that happens

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when a tower is built too large, which is a frequent case when the architect, not knowing the Christian value and function of a tower, tries to produce an architectural effect with a feature that is not by nature intended to be used first for one purpose and then for

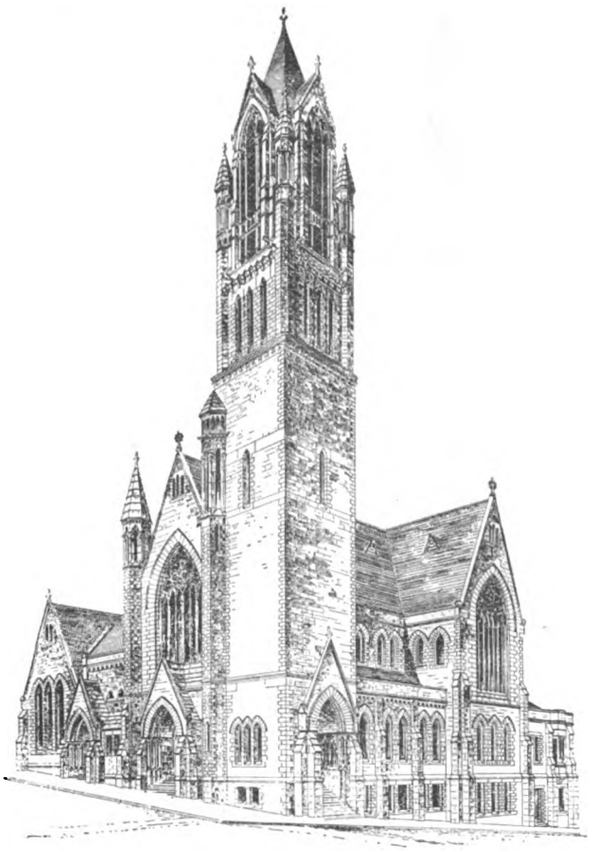


Fig. 49.

another. Figure 48, a "competitive design for a church," is another instance. As a whole, it is much superior to the preceding, but the author, in seeking a picturesque result, has placed a very large tower on a building of only tolerable dimensions. It illustrates the lack of a proper feeling for a tower, rather than any deliberate



Fig. 50.

architectural idiosyncracy. The tower is strong, simple, straightforward — all good qualities; its author, moreover, has resisted the temptation of introducing any especially striking feature under the delusion that it would add to the originality of his work. The essence of a good design is here, but the application is wrong. It was not designed as a Christian tower, but it was introduced because it made an affective group with the main portions of the building.

This study of towers may be concluded with a glance at the two competitive designs, Figures 49 and 50. Both are by the same architects, Figure 50 being an alternative design. They are introduced here not as illustrating any gross impropriety in church design, but because, being by the same authors, they hint, in a measure, at the mental processes through which an architect turns out a modern American church. The idea of the designers was obviously to obtain an effective group. One building is not more Christian than the other; one tower does not express a holier feeling than the other. Two different styles are chosen to meet the individual tastes of the committee of judges. But without undertaking to value these designs in their artistic quality, it is sufficient to point out that the Christian quality of architecture has been ignored in both. And that is what happens in most of our average church designs. Barr Ferree.

(To be continued.)

AMSTERDAM FIRE CONGRESS, 1895.[1] — II.

THE argument brought forward in Mr. Sachs's paper upon theatres was that good clear planning of theatres is of far greater importance to the audience than clever construction with certain doors of fire-resisting material, and further, that the regular attendance of fire-watches, day and night, more especially during the performances, is more essential than any amount of regular or even surprise inspection. The order in which he placed the importance of the subject with regard to the safety of the public, was that planning should come first, watching second, inspection third and construction last.

Mr. Sachs stated that it was not his intention to give a lecture, but simply to open a discussion. He did not wish to read a paper on modern theatre planning or construction, on fire-watches or theatre inspection, but simply to invite discussion on the relative merits of planning, construction, watching and inspection as far as the safety of theatre audiences was concerned, with the view of obtaining the opinion of the conference as to their order of precedence.

The opinion of the Congress if framed as a formal resolution would, he believed, be considered by all authorities entrusted with the safety of places of public amusement, and would greatly facilitate the abolition of some of the anomalies to be found in existing laws or regulations governing such premises; we all know how many serious theatre-fires we have had, the loss of life, and the lists of injured. We also know, though perhaps we scarcely realize the frequency, how often there are smaller fires at theatres of which the public, and even the authorities, hear little.

Theatre-fires have been almost identical in every country, both as regards to the outbreak, spread and result. Popularly expressed, the "fire fiend" has behaved everywhere in the same manner, and, taken as a whole, the kind of resistance offered him when once he appeared on the field has also been very much the same. Theatre-fires, as such, are generally too much for the local fire-brigade, and if there is any extensive life-saving necessary the means at the disposal of the authorities are usually quite inadequate to deal with such emergencies. Everywhere the theatre-fire has shown us that a combative policy alone would be of no avail. The results everywhere called for an energetic preventive, backed by a moderate combative policy.

Nearly every country has inaugurated a preventive policy. We have had, said Mr. Sachs, every kind of legislation conceivable for the protection of the public. There has been hysterical panic legislation, ponderous regulations in which every detail is defined by law, legislation which leaves practically everything at the discretion of an executive of experts, and regulations which are merely so by name and are a farce because they cannot be enforced. There is no uniformity in this legislation, not even in its elementary principles. If we read the regulations of the different countries consecutively with an idea of discovering what is really necessary, the result is most confusing. Some countries seem to consider good construction the essence of safety, whilst clear planning, watching or inspection are forgotten. Other countries give all attention to endless regular inspection, and omit the watching, others again require inspections only, others perhaps again good planning, construction, and ample inspection, but no watching.

Mr. Sachs pointed out that good planning in a theatre was of much greater importance to the audience than clever construction with certain powers of fire-resistance, and further, that the regular attendance of fire-watches day and night, and more especially during the performances, was more essential than any amount of regular or even surprise inspection. He went farther and considered the order of precedence to be:

1. Planning.
2. Watching.
3. Inspection.
4. Construction.

He also pointed out that he considered it the duty of the authorities to attend to the protection of life in the first place, and to the protection of property in the second. In speaking of property, he

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considered the protection of adjoining property of greater importance than the theatre "risk" itself. As we all know how easily panic occurs without any fire, and how dangerous the rush of a frightened audience can be, the clear exit of ample dimensions with the simplest route was the safest, and perfect symmetry of plan of the most value. The prevention of a cause for panic was best guarded against, he said, by the constant presence of experienced and responsible firemen, who would on the one side see the possibilities of danger and prevent it, and on the other side be able to act smartly in case of an outbreak. He did not desire to disparage good construction or regular and surprise inspections, but believed the most careful regulations as to construction practically valueless so far as the safety of the audience was concerned, if the planning was not straightforward and responsible firemen not regularly in attendance. Theatres were built under the most varied circumstances, as there are National, Court, Municipal, Subscription and Subsidized Theatres, and theatres which are simply commercial enterprises. Mr. Sachs said that he did not consider it of such concern for the authorities to be satisfied that the building of a private or public owner would resist fire for a given time as that the public would be able to leave the premises easily and safely. Wooden stairs would, he believed, take them quite as quickly into the open as stone ones, and stone stairs with many windings and a complicated plan would be far more dangerous than wooden ones of straight flights of, say, fourteen steps each. Of course, good construction lessens the risk of an outbreak of fire, and one would always advocate good construction where unreasonable requirements were not made.

In Mr. Woodrow's paper, dealing with the action taken by the London County Council as to the protection of theatres from fire, he pointed out that this was a subject which had occupied much of the attention of the authorities of London during the past ten or fifteen years. and that a great deal of good work had been done during that period, under the auspices of the late Metropolitan Board of Works, and its successors, the present London County Council, in improving the existing structures and enforcing the better arrangements of all new buildings of this class. This work had been done, he said, with a view to the prevention and extinction of fires and the provision of the safety of the people frequenting places of public entertainment. Old buildings had been altered and many rebuilt, while new buildings had been erected under stringent regulations.

The control of the London theatres and music-halls, said the author of this paper, was under more than one authority, as to licensing and the enforcement of good conduct, namely, the Lord Chamberlain, the police and the London County Council, but the structural arrangements with regard to the prevention of fire were entirely under the supervision of the London County Council and its officials.

It was his duty, said Mr. Woodrow, some few years ago to prepare a draft of the regulations now in force for the consideration of the theatres committee of the Council, under the directions of the architect of the Council, Mr. Thomas Blashill, F. R. I. B. A., F. S. I.

The chief difficulty which the committee had to deal with was to form a regulation as to site, for so many extraneous circumstances had to be considered in framing a rule which, while protecting the public, would not make theatre-building prohibitive. London theatres are built by individuals or companies as investments to bring in a reasonable return for the outlay; there is no subsidy or State aid, the private purse alone being the source which can be drawn upon. Considering, therefore, that these buildings must be erected in the most crowded and fashionable quarters of the metropolis, where land is the most expensive, the committee felt it impossible to enforce the provision of an entirely isolated site, for the cost of such land would cripple all theatrical enterprises, give no new theatres and keep alive all the old ones. Therefore, the regulation, as it now stands, only asks for one-half the boundary of the site to be upon a public thoroughfare.

The committee were fully alive to the advantages of an isolated site and a symmetrical plan with exits arranged on either side of the house in corresponding positions, and in order to meet this requirement of safety as far as possible, a regulation was framed providing that two exits leading into different thoroughfares should be provided from each part or division of the audience. Now as it would not always be possible with only two thoroughfares to comply with this rule, a "way" or "private passage," 10 feet wide, was allowed on one side, and is accepted as suitable for the deliverance of exits in addition to the two thoroughfares.

The next feature of importance, considered by the committee in framing the regulations, was the construction of the theatre into three risks:

1. The auditorium, with two exits from each part.
2. The stage, with brick proscenium-wall passing through the roof, and fireproof curtain.
3. The dressing-rooms.

The regulations, as adopted, enforce that the dressing-rooms must form an entirely separate block with separate exits, quite apart from the "stage" exits.

No theatre is now permitted to be built in London under or over any other building or within a distance of 20 feet from overlooking windows in other property. The number of tiers is limited to three above the pit floor. The pit floor may be sunk below the street-level, but not more than 15 feet; on the other hand, it cannot be placed more than 6 inches above such level. The height between the tiers is defined as 10 feet between the pit and balcony ceiling, and 12 feet between the gallery and ceiling over. The number of exits, as already said, must, in all theatres built or added to in this metropolis, be two to every division of the audience, and the minimum width 4 feet 6 inches for each of the two exits to each division which contains not more than 400 persons. If any division of the audience exceeds in its seating capacity 400, then for every additional 100 (or part of 100) 6 inches more must be added to the width to each of the two exits.

400 would require 4 feet 6 inches,
500 would require 5 feet,
600 would require 5 feet 6 inches,

in width, and so on up to a maximum width of 9 feet. This rule applies to doorways, passages, staircases and corridors. Any passageway, staircase, etc., over 6 feet must be divided by a centre hand-rail. It is seldom, however, that this width is required, as the seating-capacity of any one division does not often exceed 700 persons.

Staircases must have steps of uniform tread and rise, and the flights must not exceed twelve steps or be less than three steps. No staircase may have more than two flights of twelve steps without a turn. The landings must be square and no winders are allowed.

The author did not touch upon the smaller regulations, as to hand-rails, width of gangways between the seats, wire coverings to sky-lights, protection of constructional ironwork, construction of walls with brick or stone, etc., but passed on to the other regulations referring to the disposition of the more dangerous parts of the building.

Workshops, store-rooms, wardrobes, painting-rooms are not allowed within the building proper; they must be separated from the theatre by brick walls and iron doors. The same rule applies to scene-stores as well as to lime-light rooms, gas-metre chambers, engine and dynamo rooms. This latter class of apartment must be fireproof thoroughout and perfectly ventilated.

With regard to the use of the lime-light the Council have lately given much supervision to the manner in which the gases should be stored and used and to the class of fittings that should be employed, for it has been found that the careless use of the lime-light is a most fruitful source of danger in a theatre. Most of the London theatres have during the past few years entirely discarded the lime-light and adopted the electric search-light instead, with the most satisfactory result, both with regard to safety and scenic effect.

The rules as to the gas and electric-light service are too detailed and complex to dwell on in full; they occupy some pages of the regulations and are purely technical. Separate gas-services and separate metres are required (1) for the entrances, (2) for the auditorium, (3) for the stage. A dual system of lighting with oil lamps is enforced for safety; gas and electricity are, however, accepted without any oil lamps as satisfactory.

Automatic fastenings, which give way upon the public pushing the door, are the only fastenings permitted on doors which are not left on the swing during the time the public are in the building.

The rules for ventilation include the provision of a smoke extract in the roof over the stage, and the manner in which the warming apparatus must be fitted up is set forth in full detail, which need not be described here.

With regard to the fire-extinction a plentiful supply of hydrants, with fittings of the same pattern as the Metropolitan Brigade, is chiefly depended upon. As a rule, two hydrants are required on each tier in the auditorium, one on each side of the various levels of the stage, besides others in the approaches, dressing-rooms and workshops. The usual provision for wet blankets, buckets full of water, hatchets, hooks and other appliances is insisted upon. Exit notices are of course required over all doors leading out of the theatre, and in addition to this, in many theatres the safety-lamps over the doors have "Exit" painted upon the glasses.

The construction of a theatre must, of course, be fireproof with regard to walls, floors, stairs, corridors, passages, but the regulations do not insist upon the tiers themselves being of fireproof construction. London architects, however, nearly always construct these of iron and concrete, on the cantilever principle.

The author, in conclusion, mentioned the manner in which these regulations were enforced by the Council. With regard to old theatres, the Council have power to compel structural alterations to be made where they deem it necessary for the prevention of fire and safety of the public. Although old theatres cannot be made to comply exactly with the regulations, the alterations required are generally based upon the principle of these regulations to make the old premises as nearly up-to-date as circumstances will allow. With regard to new theatres, plans have to be submitted for the examination of the Council's architects, who report to the committee as to whether the buildings when erected will comply with the regulations. If when finished all the regulations are complied with, then a certificate is issued, and the building when licensed is opened to the public. No building, however, is opened till the architect has certified its satisfactory completion in accordance with these regulations.

The duties of the Council's architects do not end with the examination and reporting upon plans, they periodically inspect and survey the structures both by day and night, and visit the premises when the public are witnessing the performances, to see that all the exits are free, the safety-lamps alight, the "panic" bolts in working

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order and all doors ready to be opened with a push by the public themselves. These inspections are made sometimes unknown to the proprietors, the officer mixing with the audience, and paying for admission as one of the public, but at other times the survey is made in company with the manager of the theatre. All defects noted are reported to the theatre's committee of the Council, who having considered them, request the manager to remedy them forthwith.

There is, however, said Mr. Woodrow, no regular fire-brigade inspection enforced in London, and the Council feel to a great extent that this is a grave defect. There appear to be difficulties or want of parliamentary powers in the way of providing for the expenses of this inspection, which every one interested in the safety of the public and the protection of theatres from fire must wish to see promptly swept away.

ROUND ABOUT THE LONDON PICTURE GALLERIES.

A BEAUTIFUL portrait by M. Dagnan-Bouveret may be seen at the New Gallery in Regent Street. Small, but vigorous, superb in color and perfect in draughtsmanship, this little gem is worth a cart-load of the ordinary life-size portraits. Dark haired, with an olive complexion, and arrayed in a dull green coat, M. Paul von Stetten stands in front of a pinkish-white canvas, just primed and ready for use upon the easel. Behind this are a few touches of color — what you will — pictures, studies, *etceteras*, of the studio; formless touches which serve their purpose in bringing the composition into perfect harmony. It is the very perfection of painting — solid, rich and glowing, and each part put in with the deftest of touches. Next to this gem stands a lady in white — a profile, somewhat hard, relieved against a dark background. Light cuts the edge of the face and figure all the way down (it is a half length); but the light is brilliant and in the gown takes various reflections. Rather a supercilious smiling person is "Madame G."; but M. Courtois may be congratulated upon the success of the picture, which some persons might think was suggested by the Ingres portrait we all know so well, over in Paris.

M. Carolus-Duran's "Fritz-Thaulow" is a fine mass of color and a wonderful exhibition of strength in modelling, but there is a slight want of refinement in the treatment. Not so M. Carl von Stetten's "Gustave Courtois," which is not new — it figured in a *Salon* some years ago. Nothing could be more brilliant than this flesh painting; it seems to live and move as one looks at it. Near by is another old friend, painted years ago by Frederick Sandys, "Mrs. Lewis." Here is what used to be considered the perfection of finish — each vein, each wrinkle of the old lady's face; and a background such as Van Eyck would have loved — a mirror reflecting a lamp and knick-knacks upon a mantle-shelf, over and over again. This is crisply and freely painted; but the lady leaves much to be desired; it is hard and lifeless, and the knowledge of what to suppress, in which Van Eyck was supreme, is totally absent. This old lady is a mere puppet as compared to Dagnan-Bouveret's portrait. The Scotch School is well represented, but there is a want of completeness in their work — finish, considered in the light of leaving nothing to be desired, however sketchy the work may be. Mr. Abbey's pastels at the Fine Art Society's rooms in Bond Street, are an instance of this. They are all mere sketches, done in an hour or two; and yet, who wants them carried any farther? A few strokes gives one the impression of a lady drinking her tea; another is an exquisite harmony of color; a third is the perfection of drawing in the turn of a knee, or the fold of a coat. But Mr. Guthrie's portraits seem to want something more put into them, and give one the impression of being done from persons who were in a hurry to go away. Possibly few people now would sit for seven or eight consecutive days, mornings and evenings, and dine with the painter, as Sir Peter Lely told Mrs. Mary Beale was the wont of some of Van Dyck's sitters!

Mr. Whistler exhibits a dirty-faced gypsy, in a dingy red shawl — a clever sketch, but scarcely happily named "Crimson Note, Carmen," for one's idea of that impertinent baggage, the cigar-maker, is no more like this gloomy old woman than is the head-gear properly named crimson.

Mr. Watt's "Mrs. Edward Ellice" is in his best style. Pastel, as a sketching medium, is happily exampled in Mr. Llewellyn's vigorous work "A Sketch." We are frequently told that the new crayon work is not to be compared to the old; but when looking at Mr. Abbey's pastels, let us think for a moment of that dreary chamber in the Louvre, where, with the exception of Chardin's, we see a number of pretty imbecilities, with every touch softened off into a sort of powdered effect. In our modern work, each stroke tells, and not one is ashamed of being left as the crayon placed it. It is all fashion some will say. Possibly; but if the admiration of Velasquez is no new thing, if in oil painting we may see each stroke of the brush, if perfection in painting consists in the art of leaving out the unnecessary, and the knowledge of what to sacrifice and suppress, why should not a pastel sketch be done in like manner? Happily, the public is getting educated and does not measure perfection in art by the number of weeks spent over a picture. The clever physician gives you a diagnosis of your complaint in a few minutes; and so, likewise, the clever artist grasps his subject, and gives you the impression upon his mind in a few strokes of his brush.

Mr. Yellow-book Beardsley shows a portrait which seems to have strayed away from the advertisement-page of a newspaper; or is it one of those disagreeable cards (possibly advertising rocking-horses) which we find when we turn over the pages of a magazine? A good deal is suppressed in this person's drawings, which, of course, as we have said, is one element of perfection in art; but possibly still further sacrifice, or the total suppression of this type of beauty, would not cause much lamentation and weeping amongst the votaries of true art.

S. Beale.

STUDY OF THE HISTORY OF ARCHITECTURE.

AS an *addendum* to the Report of the Committee on Education to the Convention of the American Institute of Architects at St. Louis, Mr. Van Brunt read more or less of the following extract from a paper describing the methods by which the history of architecture is taught at Columbia College:

But these studies take little cognizance of what was the prime factor in the production of these works of art, the fertile and ingenious mind of the old workman himself; all the facts of his environment, which are so interesting to us, and which present themselves so conspicuously to our minds as the main elements of the situation, were to him simple matters-of-course. He did not think of them. They had not part in the reasoning which determined his action, an action which was determined, as we may believe, not by any process of reasoning from recognized principles, but by simple considerations of good sense and good taste. Of most of the influences which seem to us to have been so powerful he was as unconscious as of the air he breathed, and the rest he felt only as he recognized the limitations of the conditions under which he worked. Even the logical and æsthetic principles which underlay his work and, as we can see, largely controlled it, were for the most part, as always happens with the skilful workman, only half revealed to him.

It is by no means clear, indeed, how far these considerations entered, even unconsciously, into the mind of the designer. It is easy to over-estimate their real influence and to overlook the fact that what is really the most potent agency in determining the form of a work of art is the purely artistic consideration of grace of line and harmony of proportion, and that these are the same in all ages and under all conditions. It is difficult to enter into the feelings of antiquity or of the Middle Ages in regard to religion, government, society and natural science. The modern man is a different creature from the man of that day in all these relations. But the artists of all ages are brothers of the same family. While accordingly it is difficult to make the study of history of practical service in those fields, it being hardly possible to understand the conditions well enough to glean from them examples pertinent to our own needs, the history of art is more intelligible and more serviceable. Its monuments, if studied from the point-of-view of the men who made them, are full of meaning, and that point-of-view is not altogether impossible of attainment. If this were not so, the study of architectural history would have no more place in a school of architectural design than has the study of archæology. It would be curious and interesting, but of no immediate service.

For what occupied the attention of the architects of those times was, as has been said, the single question how to do the work in hand in a sensible and agreeable manner. The way for us to understand why they answered this question in the way they did, and thus to enter into the real understanding of the results, is to put ourselves as far as possible into their place and to set before ourselves not their achievements, as examples to be classified, arranged and comprehended, but the problem they had to solve and the conditions which controlled their solution of it.

It is in this aspect that historical architecture is presented to our students in their exercises in historical design. We exhibit to them the architecture of the past as a series of problems just as it appeared to the builders of its own day, and we hope thus not only to give them a clearer insight into the real spirit and character of the master-pieces that have come down to us, by bringing to view the ideas and considerations which really influenced their designers, but at the same time to exercise our own young men in the practical application of those same ideas. We hope thus to develop in them the same good sense and good taste, the same readiness of invention and happy ingenuity, to which these masterpieces are due.

The exercises themselves may be described as a species of design by description or by dictation. The attempt is made, by indicating the conditions under which a given piece of work was executed, to present to the student the same problem that the workman of old was called upon to solve. The student can then compare his own solution of it with the one that has come down to him, thus receiving correction and guidance in his work from the hand of the master. It is plain that the special excellencies of the original monument are likely to reveal themselves with fresh distinctness, and to find special sympathy and appreciation in the mind of one who has striven, however unsuccessfully, to solve the same problem.

An example or two taken from widely different fields will suffice to illustrate this. In studying vaulting, we once got so far as to understand how oblong vaults were thrown across a nave, while square vaults covered the aisles. A class of fifteen or twenty students were then asked to find out how a semi-circular or polygonal apse could be added to a choir roofed on this system. In the course of a couple of hours' figuring I found that they had worked out, among them, all the five solutions of this problem, which in the Middle Ages it took one or two hundred years to develop. This was

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very encouraging. At another time they were given a somewhat minute description of four pilaster capitals from Blois or Chambord, and they made thumb-nail sketches on the spot according to their interpretation of the description. The next day photographs and drawings of a dozen or twenty other such capitals were given them, so that they might understand the fashion of the time, and they were told to draw out their sketches on a larger scale. The result was fifteen or twenty sets of capitals, all showing the same four motives, but differing in a most interesting way according to the personal differences of taste and skill on the part of the designers.

On another occasion the First-year class, after their studies in Egyptian and Assyrian architecture, made a dozen or twenty restorations of Solomon's Temple, according to the description in the Book of Kings. The drawings they produced showed considerable fertility of invention, especially in the designs for Jachin and Boaz, and the whole series together seemed to be quite as creditable, and as reasonable, as most of those which have from time to time been put forth by the learned.

It is an obvious variation of these exercises, and a great extension of their usefulness, to let the students write the descriptions themselves, then exchange papers and interpret each other's papers as they best can. It constantly happens, when description and interpretation are both careful and scholarly, that the result looks like a copy of the photograph or drawing from which the dictation was made. It is surprising and instructive, indeed, to see how much of the spirit and charm of an original is preserved in spite of considerable changes of proportion and detail.

This practice in historical design we believe to be founded on sound theoretical principles. To regard a work of art as far as possible from the point-of-view of the artist is, indeed, the first principle of fair and intelligent criticism. To foster the individuality and personal initiative of a pupil by bringing authority to bear upon him in the way of correction at the end of his task, and guidance and suggestion at the beginning, rather than control during the course of the work, is the first principle of intelligent teaching. Moreover, the results, so far as we have gone, have justified the method. We have, indeed, employed it hitherto mainly as a matter of experiment, when favorable circumstances have suggested it. But every year we use it to a greater and greater extent, and it is gradually acquiring a recognized place as an integral portion of our work.

A considerable step in this direction was taken last winter when we undertook to apply this method of "Design by Dictation" to the study of the architecture of the Renaissance by the Second-year class. We began with doors and windows, giving out a list of the elements that entered into their composition — such as architrave, frieze and cornice, arches and imposts, pediments and pilasters, pedestals and balusters, consoles, brackets, modillions, sills and thresholds — forms with which they had already become familiar in the study of the Orders. They were told to design a dozen windows, ranging from the most simple they could conceive to the most complicated, making sketches in the class at as small a scale as possible, and drawing them out afterwards to a one-fourth-inch scale, approximately. These were criticised from the point-of-view of proportion and evidence, as they were studied with tracing-paper. As a second lesson, several examples of doors and windows from Létarouilly's Rome were dictated in detail, and the resulting interpretations compared with the originals. Finally, we were fortunate enough to discover that there was a certain type of doorway of which we could find no example; namely, a doorway furnished with large consoles, after the fashion of Vignola's classical example in the Church of San Damaso in the Cancellaria, but with a mutulary Doric frieze and entablature. This was a highly successful experiment. Half a dozen of the class devised forms of console quite in keeping with the triglyphs and mutules, thus adding, it would seem, a new feature to the resources of the Classical architect.

This was followed by similar exercises in the treatment of vaults and ceilings, of wall-surfaces, external and internal, of spires, stairways, and others of the larger features. All this was in preparation for the problems in Design which occupied the third and fourth years.

We are proposing to extend this method during the coming winter to still more elementary work, in the study of the Orders themselves, and to more advanced work, in the study of planning.

These exercises were, indeed, a part of the course in Design. But the principle is the same, and it can easily be applied, as the first cited examples have shown, to the study of the historical development of style. Every step in the evolution of Gothic architecture was taken by varying the procedure which at any moment happened to be in vogue, in accordance with some suggestion of improved construction of ornamentation. The most successful variations survived by a process of natural selection. It is perfectly practicable, as we found in the case of apsidal vaulting, for these same suggestions to be made to the student, so that he may tread in the precise footsteps of the Free-masons, forestalling, in fact, in his own experience, the revelations of the text-book. This "Design by Anticipation," as it may be called, will, we hope, come to play a valuable part in our strictly historical studies, as a sort of obligato accompaniment to the lectures on Architectural History, from the time of the Pharaos to that of the Georges.

The local peculiarities that distinguish the styles of France from those of Italy, and those of Spain from those of Germany and England, are obviously amenable to this treatment. It is, after all, merely a special application of the principle, that it is better for a student to find things out for himself than to be told them. The artist, whose function is a creative one, whose business it is to do original work, and to whom "imitation is suicide," — yet who must be well versed in the experience of his kind — profits greatly if he can gain this erudition in the exercise of his active and inventive powers, instead of assuming during the long time necessary of its acquisition a passive and merely receptive attitude. The architect, especially, is what the Greeks call the Poet, and what Chaucer calls him too, a *maker*.

It is not, of course, every student who can rise to the full height of this argument, although it is true, as Mr. Emerson contends, that every man may be a man of genius as far as he goes, and that whatever spark of originality he has, should be sacredly cherished. But some men at least, in every class, can profit by these exercises to the utmost, and these should not be deprived of this experience. Others may follow haltingly and may, after all, have to be shown what they have not the wit to discover. But they are no worse off if told things at last than they would have been if told them at first. Indeed, they are better off, for the sense of baffled endeavor makes one specially appreciative of assistance. The information comes, as a "felt want," to a mind disciplined to receive it. The main trouble in getting such men to receive new information is that they do not, in general, feel that they want it.

These four exercises, the Lectures on History and Ornament, with the study of English, French and German text-books, the Historical Research, the Historical Drawing and the Historical Design occupy a chief part of the student's time during the first three years of the course. At the end of the third year the stated instruction by recitations and the lectures is virtually finished, the fourth year being, by an arrangement, which is perhaps a novelty in places of learning, quite free from lectures or recitations. The men give their whole time by day to problems in design, to what may be called "*atelier* work," without interruption. Their evenings, throughout the whole year, are devoted to historical study. As the college library, including the Avery library, as well as the books and photographs belonging to the Department of Architecture, is accessible every evening until 11 o'clock, and the Metropolitan Museum is open twice a week until 10, every facility is afforded for the prosecution of this work. In order to make the most of these appliances, every student of the Fourth-year class and all the special students, (who are of similar grade, being received only in advanced standing,) prepares once a month, under the name of Advanced Architectural History, an original paper. This he illustrates by drawings and reads to the class. All this affords an almost unexampled opportunity for serious work.

Whether this long course of historical study and investigation, occupying a large portion of the student's time, during four years, will materially contribute to the result anticipated in the committee's report of last year, we do not know. We do not feel that it very much concerns us to know. We do not see that we have any call to map out the future, to cast its horoscope, or to attempt to influence events toward the issues that are indicated by any astrology that we can devise. We distrust the science which, in our present state of ignorance, undertakes to foretell or to control the architectural weather. All we can be sure of is that the architecture of the future will be good or bad, noble or ignoble, fair or foul, according to the personal character and professional prowess of the men who have it in hand. All we can do is, if possible, to inspire the young men who come under our hands, with a certain measure of good sense and good taste, teaching them by precept and by the example of history that in art, as in life, temperance and refinement of conduct come from firmness of mind and elevation of soul, and that these are the only sure means to those ends.

Here historical studies, pursued as we aim to pursue them, are of inestimable service. They not only train the active and artistic powers, but by giving, as we hope, a keener appreciation of the excellence of excellent things, refine the taste and fortify and confirm the judgment. They become the most efficient safeguard against the wild and wanton demonstrations which both in Europe and in this country have so often borne witness to the native force and vigor of an undisciplined and unchastened imagination.

THE GOVERNMENT TIMBER TESTS.

THE following Resolutions were adopted by the Association of Railway Superintendents of Bridges and Buildings at the Fifth Annual Convention, at New Orleans, La., October 15, 1895.

Whereas a most comprehensive and valuable series of investigations into the properties of wood and tests of the strength of our commercial timbers have been carried on in the Division of Forestry of the United States Department of Agriculture:

Whereas these investigations have already demonstrated that a most decided improvement in the practice with timber structures and use of wood and a saving of millions of dollars worth of wood material are attainable as a result of these investigations:

Be it Resolved, That we, the American International Association of Railway Superintendents of Bridges and Buildings, assembled in regular session at our Fifth Annual Convention, at New Orleans, La., October 15, 1895, endorse, as railroad officials in charge of the construction and maintenance of timber structures and buildings of railroads

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throughout the United States, the work thus inaugurated by the United States Government as tending towards a most needful and rational economy of our forest resources and desirable improvements in their use, resulting not only in a great saving to users of timber throughout the country, but especially offering a valuable guarantee for the absolute safety of properly designed timber structures:

Resolved further, That we ask our Representatives in Congress to make liberal appropriations for the continuance and more rapid advance of this work, in order to secure, as quickly as possible, the much needed information, believing that the Government alone is in a position to secure it and that it is true economy to provide it without delay:

Resolved further, That these resolutions be transmitted to the President of the Senate, the Speaker of the House of Representatives, the Secretary of Agriculture, the Chairman of the Committee on Agriculture of the Senate and the Chairman of the Committee on Agriculture of the House of Representatives.

REPORT OF COMMITTEE ON "STRENGTH OF BRIDGE AND TRESTLE TIMBERS."

Your Committee appointed to report on "Strength of Bridge and Trestle Timbers," with special reference to southern yellow pine, white pine, fir and oak, desires to present herewith, as part of their report, the very valuable data, compiled by the Chairman of the Committee, relative to tests of the principal American bridge and trestle timbers and the recommendations of the leading authorities on the subject of strength of timber during the last twenty-five years, embodied in the appendix to this report and tabulated for easy reference in the accompanying tables, I to IV.

The uncertainty of our knowledge relative to the strength of timber is clearly demonstrated after a perusal of this information, and emphasizes, better than long dissertations on the subject, the necessity for more extensive, thorough and reliable series of tests, conducted on a truly scientific basis, approximating as nearly as possible actual conditions encountered in practice.

The wide range of values recommended by the various recognized authorities is to be regretted, especially so when undue influence has been attributed by them in their deductions to isolated tests of small-size specimens, not only limited in number, but specially defective in not having noted and recorded properly the exact species of each specimen tested, its origin, condition, quality, degree of seasoning, method of testing, etc.

The fact has been proved beyond dispute that small-size-specimen tests give much larger average results than full-size tests, owing to the greater freedom of small selected test-pieces from blemishes and imperfections, and their being, as a rule, comparatively drier and better seasoned than full-size sticks. The exact increase, as shown by tests and by statements of different authorities, is from 10 to over 100 per cent.

Great credit is due to such investigators and experimenters as Profs. G. Lanza, J. B. Johnson, H. T. Bovey, G. B. Wing, and Messrs. Onward Bates, W. H. Finley, C. B. Talbot and others, for their experimental work and agitation in favor of full-size tests. Professors G. Lanza, R. H. Thurston and Wm. H. Burr have contributed valuable treatises on the subject of strength of timber. The extensive series of small and full-size United States Government tests, conducted in 1880 to 1882 at the Watertown Arsenal, under Col. T. T. S. Laidley, and more recently the very elaborate and thorough timber tests being conducted by the United States Forestry Division under Dr. B. E. Fernow, Chief, and Prof. J. B. Johnson, of Washington University, St. Louis, afford us to-day, in connection with the work of the above-mentioned experimenters, our most reliable data from a practical standpoint.

The test data at hand and the summary criticisms of leading authorities seem to indicate the general correctness of the following conclusions:

1. Of all structural materials used for bridges and trestles, timber is the most variable as to the properties and strength of different pieces classed as belonging to the same species, hence impossible to establish close and reliable limits of strength for each species.

2. The various names applied to one and the same species in different parts of the country lead to great confusion in classifying or applying results of tests.

3. Variations in strength are generally directly proportional to the density or weight of timber.

4. As a rule, a reduction of moisture is accompanied by an increase in strength; in other words, seasoned lumber is stronger than green lumber.

5. Structures should be, in general, designed for the strength of green or moderately-seasoned lumber of average quality and not for a high grade of well-seasoned material.

6. Age or use do not destroy the strength of timber, unless decay or season-checking takes place.

7. Timber, unlike materials of a more homogeneous nature, as iron and steel, has no well-defined limit of elasticity. As a rule, it can be strained very near to the breaking point without serious injury, which accounts for the continuous use of many timber structures with the material strained far beyond the usually accepted safe limits. On the other hand, sudden and frequently inexplicable failures of individual sticks at very low limits are liable to occur.

8. Knots, even when sound and tight, are one of the most objectionable features of timber, both for beams and struts. The full-size tests of every experimenter have demonstrated, not only that beams break at knots, but that invariably timber struts will fail at a knot or owing to the proximity of a knot, by reducing the effective area of the stick and causing curly and cross-grained fibres, thus exploding the old practical view that sound and tight knots are not detrimental to timber in compression.

9. Excepting in top logs of a tree or very small and young timber, the heart-wood is, as a rule, not as strong as the material farther away from the heart. This becomes more generally apparent, in practice, in large sticks with considerable heart-wood cut from old trees in which the heart has begun to decay or been wind-shaken. Beams cut from such material frequently season-check along middle of beam and fail by longitudinal shearing.

10. Top logs are not as strong as butt-logs, provided the latter have sound timber.

11. The results of compression tests are more uniform and vary less for one species of timber than any other kind of test; hence, if only one kind of test can be made, it would seem that a compressive test will furnish the most reliable comparative results.

12. Long timber columns generally fail by lateral deflection, or "buckling," when the length exceeds the least cross-sectional dimension of the stick by 20; in other words the column is longer than 20 diameters. In practice, the unit stress for all columns over 15 diameters should be reduced in accordance with the various rules and formulas established for long columns.

13. Uneven end-bearings and eccentric loading of columns produce more serious disturbances than usually assumed.

14. The tests of full-size long compound columns, composed of several sticks bolted and fastened together at intervals, show essentially the same ultimate unit resistance for the compound column as each component stick would have if considered as a column by itself.

15. More attention should be given in practice to the proper proportioning of bearing areas, in other words, the compressive bearing resistance of timber with and across grain, especially the latter, owing to the tendency of an excessive crushing stress across grain to indent the timber, thereby destroying the fibre and increasing the liability to speedy decay, especially when exposed to the weather and the continual working produced by moving loads.

The aim of your Committee has been to examine the conflicting test data at hand, attributing the proper degree of importance to the various results and recommendations, and then to establish a set of units that can be accepted as fair average values, as far as known to-day, for the ordinary quality of each species of timber and corresponding to the usual conditions and sizes of timbers encountered in practice. The difficulties of executing such a task successfully cannot be overrated, owing to the meagreness and frequently the indefiniteness of the available test data, and especially the great range of physical properties in different sticks of the same general species, not only due to the locality where it is grown, but also to the condition of the timber as regards the percentage of moisture, degree of seasoning, physical characteristics, grain, texture, proportion of hard and soft fibres, presence of knots, etc., all of which affect the question of strength.

Your Committee recommends, upon the basis of the test data at hand at the present time, the average units for the ultimate breaking stresses of the principal timbers used in bridge and trestle constructions shown in the accompanying table.

In addition to the units given in the table, attention should be called to the latest formulas for long timber columns, mentioned more particularly in the Appendix to this report, which formulas are based upon the results of the more recent full-size timber column tests and hence should be considered more valuable than the older formulas derived from a limited number of small-size tests. These new formulas are Professor Burr's, App. I.; Professor Ely's, App. J.; Professor Stanwood's, App. K.; and A. L. Johnson's, App. V.; while C. Shaler Smith's formulas will be better understood after examining the explanatory notes contained in App. L.

Attention should also be called to the necessity of examining the resistance of a beam to longitudinal shearing along the neutral axis, as beams under transverse loading frequently fail by longitudinal shearing in place of transverse rupture.

In addition to the ultimate breaking unit stress, the designer of a timber structure has to establish the safe allowable unit stress for the species of timber to be used. This will vary for each particular class of structures and individual conditions. The selection of the proper factor-of-safety is largely a question of personal judgment and experience, and offers the best opportunity for the display of analytical and practical ability on the part of the designer. It is difficult to give specific rules. The following are some of the controlling questions to be considered:

The class of structure, whether temporary or permanent, and the nature of the loading, whether dead or alive. If alive, then whether the application of the load is accompanied by severe dynamic shocks and pounding of the structure. Whether the assumed loading for calculations is the absolute maximum rarely to be applied in practice or a possibility that may frequently take place. Prolonged heavy steady loading and also alternate tensile and compressive stresses in the same piece will call for lower averages. Information as to whether the assumed breaking stresses are based on full-size or small-size tests, or only on interpolated values averaged from tests of similar species of timber, is valuable in order to attribute the proper degree of importance to recommended average values. The class of

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timber to be used and its condition and quality. Finally, the particular kind of strain the stick is to be subjected to and its position in the structure with regard to its importance and the possible damage that might be caused by its failure.

In order to present something definite on this subject, your Committee presents the accompanying Table, showing the average safe allowable working unit stresses for the principal bridge and trestle timbers, prepared to meet the average conditions existing in railroad timber structures, the units being based upon the ultimate breaking unit stresses recommended by your Committee and the following factors-of-safety, viz:

Tension, with and across grain	Ten.
Compression, with grain	Five.
" across grain	Four.
Transverse rupture, extreme fibre stress	Six.
" " modulus of elasticity	Two.
Shearing, with and across grain	Four.

In conclusion, your Committee desires to emphasize the importance and great value to the railroad companies of the country of the experimental work on the strength of American timbers being conducted by the Forestry Division of the United States Department of Agriculture, and to suggest that the American Association of Railway Superintendents of Bridges and Buildings endorse this view by official action and lend its aid in every way possible to encourage the vigorous continuance of this series of Government tests, which bids fair to become the most reliable and useful work on the subject of strength of American timbers ever undertaken. With additional and reliable information on this subject, far-reaching economies in the designing of timber structures can be introduced, resulting not only in a great pecuniary saving to the railroad companies, but also offering a partial check to the enormous consumption of timber and the gradual diminution of our structural timber supply.

WALTER G. BERG, *Chairman*,
J. H. CUMMIN,
JOHN FOREMAN,
H. L. FRY,
Committee.

AVERAGE SAFE ALLOWABLE WORKING UNIT STRESSES IN POUNDS PER SQUARE INCH.[1]

KIND OF TIMBER.	TENSION.		COMPRESSION.			TRANSVERSE RUPTURE.		SHEARING.	
			With grain.						
	With grain.	Across grain.	End bearing.	Columns under 15 diameters.	Across grain.	Extreme fibre stress.	Modulus of elasticity.	With grain.	Across grain.
Factor-of-safety.	Ten.	Ten.	Five.	Five.	Four.	Six.	Two.	Four.	Four.
White Oak	1,000	200	1,400	900	500	1,000	550,000	200	1,000
White Pine	700	50	1,100	700	200	700	500,000	100	500
Southern, Long-Leaf or Georgia Yellow Pine	1,200	60	1,600	1,000	350	1,200	850,000	150	1,250
Douglas, Oregon and Washington Fir or Pine. { Yellow Fir.	1,200	—	1,600	1,200	300	1,100	700,000	150	—
{ Red Fir.	1,000	—	—	—	—	800	—	—	—
Northern or Short-Leaf Yellow Pine	900	50	1,200	800	250	1,000	600,000	100	1,000
Red Pine	900	50	1,200	800	200	800	600,000	—	—
Norway Pine	800	—	1,200	800	200	700	600,000	—	—
Canadian (Ottawa) White Pine	1,000	—	—	1,000	—	—	—	100	—
Canadian (Ontario) Red Pine	1,000	—	—	1,000	—	800	700,000	100	—
Spruce and Eastern Fir	800	50	1,200	800	200	700	600,000	100	750
Hemlock	600	—	—	800	150	600	450,000	100	600
Cypress	600	—	1,200	800	200	800	450,000	—	—
Cedar	800	—	1,200	800	200	800	350,000	—	400
Chestnut	900	—	—	1,000	250	800	500,000	150	400
California Red-wood	700	—	—	800	200	750	350,000	100	—
California Spruce	—	—	—	800	—	800	600,000	—	—

AVERAGE ULTIMATE BREAKING UNIT STRESSES IN POUNDS PER SQUARE INCH.[1]

KIND OF TIMBER.	TENSION.		COMPRESSION.			TRANSVERSE RUPTURE.		SHEARING.	
			With grain.						
	With grain.	Across grain.	End bearing.	Columns under 15 diameters.	Across grain.	Extreme fibre stress.	Modulus of elasticity.	With grain.	Across grain.
White Oak	10,000	2,000	7,000	4,500	2,000	6,000	1,100,000	800	4,000
White Pine	7,000	500	5,500	3,500	800	4,000	1,000,000	400	2,000
Southern, Long-Leaf or Georgia Yellow Pine	12,000	600	8,000	5,000	1,400	7,000	1,700,000	600	5,000
Douglas, Oregon and Washington Fir or Pine. { Yellow Fir.	12,000	—	8,000	6,000	1,200	6,500	1,400,000	600	—
{ Red Fir.	10,000	—	—	—	—	5,000	—	—	—
Northern or Short-Leaf Yellow Pine	9,000	500	6,000	4,000	1,000	6,000	1,200,000	400	4,000
Red Pine	9,000	500	6,000	4,000	800	5,000	1,200,000	—	—
Norway Pine	8,000	—	6,000	4,000	800	4,000	1,200,000	—	—
Canadian (Ottawa) White Pine	10,000	—	—	5,000	—	—	—	350	—
Canadian (Ontario) Red Pine	10,000	—	—	5,000	—	5,000	1,400,000	400	—
Spruce and Eastern Fir	8,000	500	6,000	4,000	700	4,000	1,200,000	400	3,000
Hemlock	6,000	—	—	4,000	600	3,500	900,000	350	2,500
Cypress	6,000	—	6,000	4,000	700	5,000	900,000	—	—
Cedar	8,000	—	6,000	4,000	700	5,000	700,000	—	1,500
Chestnut	9,000	—	—	5,000	900	5,000	1,000,000	600	1,500
California Red-wood	7,000	—	—	4,000	800	4,500	700,000	400	—
California Spruce	—	—	—	4,000	—	5,000	1,200,000	—	—

[1] Recommended by the Committee on "Strength of Bridge and Trestle Timbers." American Association of Railway Superintendents, Bridges and Buildings.—Fifth Annual Convention, New Orleans, October, 1895.

SOCIETIES

NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

AT the Annual Meeting, on the 13th inst., of the New York Chapter of the American Institute of Architects, the following ticket for the ensuing calendar year was elected:

R. M. Upjohn, *President;* John M. Carrère and R. H. Robertson, *Vice-Presidents;* A. J. Bloor, *Secretary* and *Treasurer;* E. H. Kendall and R. H. Hunt, *Executive Committee;* A. Eichhorn, P. L. LeBrun and S. E. Gage, *Committee on Library and Publications;* N. Le Brun, R. M. Upjohn, A. J. Bloor, E. H. Kendall and R. E. Gibson, *Committee on Examinations.* Mr. James B. Baker was elected a practising member.

Reports from the various Standing Committees were accepted and included the following items:

The report of the Executive Committee showed that a proposition for an *International* Institute of Engineers and Architects had been referred to the A. I. A.; the Chapter had acceded to affiliation with the Fine Arts Federation of New York, correspondence had been held with the Western New York Chapters A. I. A. in relation to getting a bill through the State Legislature for the licensing of architects, and the Secretary had corresponded with Mayor Strong in reference to the claims of architects who had competed for the proposed City-hall.

The Committee on Library and Publications reported that it continued to receive the current issues of some of the principal American, English, French and German architectural serials, among them the *British Architect* and the *London Building News*, *L'Architecture* and *La Construction Moderne*, and the *Zeitschrift des Oesterreichischen-und-Architeken-Vereines*, as well as those of the American Society of Civil Engineers.

The Secretary had presented for the Chapter library, T. M. Clark's well conceived and very useful volume, "*Architect, Owner and Builder before the Law*," long a desideratum in American practice, and he continued as from the first number of each to receive and have bound the current issues of the *American Architect and Building News*, *Architecture and Building* and the *Architectural Record*, with the intention, the Committee stated, of bequeathing them with other reading matter, to the Chapter.

The rebinding, among other volumes, of the entry-book for architectural assistants, draughtsmen and students in search of positions, recalls the fact that the entries in that book of twenty-five years' standing have reached 935,925.

The report of the Committee on Examinations alluded to a letter addressed some time ago by Mr. Stevenson Constable, Superintendent of Building Department, to a number of experts expressing, in substance, his desire for any information derived from such current experience in their practice as may furnish points and suggestions toward further amendments to the Building-law, which code has not yet been brought abreast of the essentials for complete safety demanded by the constant development and experiments incidental to the erection of high structures dependent on the system of steel caging or other metallic framework. In the previous instances, the report went on to say, of the revision of the city's building-laws, the Chapter's Examination Committee had been called to take part; and in view of this communication from the head of the Building

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Department, the suggestion was offered that the Chapter might do well to make him a formal offer of assistance in the compilation of building regulations "up to date."

The following minute, prepared by a Special Committee, consisting of Mr. Howard Constable and the Secretary, was adopted:

"In the death of Mr. James Renwick, Practising Member of the New York Chapter A. I. A. and one of the founders and Charter Members of the Institute, the parent organization and the oldest of its now numerous component parts, the Chapters have alike lost one of the best known and most respected of their colleagues, the profession one of its most successful practitioners, and the community an architect who, in 'the day of small things' for art in this country and in the midst of the then crude conditions influencing the public mind, made the most (as is shown in the biographical sketch of his professional life appended to the published *Proceedings* of the Institute's Twenty-first Annual Convention) of the meagre appreciation and niggardly opportunities offered to the professors of the various Fine Arts, and produced results not inferior, and sometimes superior, to much current work, having the advantage of environments, appliances and rewards greatly more conducive to artistic development. In his private relations, Mr. Renwick enjoyed widespread and well-deserved popularity, and New York loses one of its foremost citizens in his demise."

Much satisfaction exists, among the members of the Chapter, in view of their convenient and cheerful new quarters up town in the recently erected office-building, 156 Fifth Avenue, northwest corner of 20th Street.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE MERCANTILE CLUB-HOUSE, PHILADELPHIA, PA. MESSRS. BAKER & DALLETT, ARCHITECTS, PHILADELPHIA, PA.

[Gelatine Print issued with the International and Imperial Editions only.]

COMPETITIVE DESIGN FOR THE MINNESOTA STATE-HOUSE, ST. PAUL, MINN. MESSRS. WENDELL & HUMPHREYS, ARCHITECTS, DENVER, COLO.

THIS design deserves the careful consideration of our readers from the fact that to its authors was awarded in the first competition, by the expert advisers, Messrs. Wheelwright and Cobb, the first place amongst the five designs commended. Moreover the design here shown and submitted in the second competition was ranked by the expert adviser, Mr. Wheelwright, amongst the five designs which he considered deserving of the five prizes. Yet, acting within the limits of their discretion, the Capitol Commissioners thought it wise to displace this design in favor of one that was not recommended by Mr. Wheelwright.

For their efforts and expenditure of time and money the authors have, then, to console themselves with having achieved a distinct professional success, a rather meagre consolation in view of the fact that they had once seemingly won the position of architect to the executed work and the second time had won a money-prize which would in a degree have offset the cost of their work. If the authors' allegations are to be accepted, they seem to have been in the second instance the innocent victims of a curious case of mistaken identity, based not on a similarity of names, but on the less substantial similarity of initials. Admitting that the Commissioners had testimony which justified suspicion — testimony, however, which the authors declare that, given time, they can overthrow — it seems to us that, all things considered, they might have contented themselves — if their decision was based on the alleged suspicion — with assigning the work to Mr. Gilbert and yet making the distribution of the minor prizes in accordance with the expert's award. It seems to be peculiarly a case where something in the nature of a "consolation prize" is called for.

PLANS OF THE SAME.

TENEMENT-HOUSE, BAKER ST., PHILADELPHIA, PA. MESSRS. WILSON BROS. & CO., ENGINEERS AND ARCHITECTS, PHILADELPHIA, PA.

THIS building was erected for the "Beneficent Building Association," of Philadelphia, whose object it is to buy up and remove the miserable hovels in which many of the poorer class are lodged in this as in other large cities, and replace them with buildings which shall afford decent accommodation at an equally low rent. To accomplish this object, it is necessary that the rooms be as small as possible consistently with sanitary requirements, so as to bring the rent within the reach of this class of tenants; and to make the building as simple and inexpensive as possible with due regard to their comfort and safety. The central portion of the building, including stairs and water-closets, is strictly fireproof — the stairs being of iron, the floors of concrete and all the walls and partitions of brick, making what is known as the 'tower fire-escape," in accordance with the requirements of the Philadelphia Building-Laws in this particular, and insuring greater cleanliness in this part of the building which is used in common by all the tenants. The other parts of the building are of ordinary construction, with wooden floors and partitions. Bath-rooms and bins for the storage of coal are provided in the basement.

ALTERATIONS TO HOUSE OF J. D. SAFFORD, ESQ., SPRINGFIELD, MASS. MR. E. J. PARLETT, ARCHITECT, SPRINGFIELD, MASS.

[Additional Illustrations in the International Edition.]

ALL SAINTS' EPISCOPAL CHURCH, LOMBARD AND ASHMONT STS., ASHMONT, BOSTON, MASS. MESSRS. CRAM, WENTWORTH & GOODHUE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

ALTHOUGH this building was dedicated and occupied in December, 1893, it was not consecrated until last Sunday. It is built of seam-faced granite and has been paid for by private subscription among the parishioners, the largest subscription being the gift of Col. Oliver W. Peabody, who only recently paid off the remaining debt and made all the sittings free. The tower was erected by Mr. and Mrs. Peabody in memory of Everett Peabody, killed at the battle of Pittsburgh Landing, April 6, 1862, and of William Bourne Oliver Peabody, who died March 3, 1894.

SYNAGOGUE OF THE NORTH CHICAGO HEBREW CONGREGATION, LA SALLE AND GOETHE STS., CHICAGO, ILL. MR. S. S. BEMAN, ARCHITECT, CHICAGO, ILL.

[Gelatine Print.]

GRAY'S INN CHAPEL, FROM THE CHANCEL, LONDON, ENG. RESTORED BY MR. C. H. SHOPPEE, ARCHITECT.

DETAIL OF NO. 69 ALDERSGATE ST., LONDON, ENG. MESSRS. ROMAINE, WALKER & TANNER, ARCHITECTS.

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Triennial Exhibition of the Massachusetts Charitable Mechanic Association, including Art Exhibition and Special Poster Show: October 2 to November 30.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St., opened October 14.

Egyptian and Venetian Sketches, by Hamilton Emmons: at J. Eastman Chase's Gallery, 346 Boylston St., November 19 to December 3.

Vinton's Portrait of Archbishop Williams: at Williams and Everett's Gallery, 190 Boylston St.

BRIDGEPORT, CONN. — *Exhibition of Artistic Posters:* at the Public Library, November 9 to 30.

CHICAGO, ILL. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

Paintings by Glasgow and Danish Artists: November 19 to December 22.

NEW YORK, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Loan Exhibition of Portraits: at the National Academy of Design, October 30 to December 4.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South, opens November 28.

PHILADELPHIA, PA. — *Autumn Exhibition of the Philadelphia Art Club:* opened November 18.

Works by Swedish Artists: at the Pennsylvania Academy of Fine Arts, until December 5.

PITTSBURGH, PA. — *Loan Collection of Paintings:* at the Carnegie Library, during November.

NOTES AND CLIPPINGS

A PRIZE FOR AN ESSAY ON HEATERS. — The German Hygienic Association offers a prize of 1,200 American dollars for an original essay on electric heaters. It must be written in German, and sent in before July 1, 1896, to Prof. Konrad Hartmann, 18 Fasannstrasse, Charlottenburg. The essay will remain the property of the author, but he must publish it within six months. — *London Globe.*

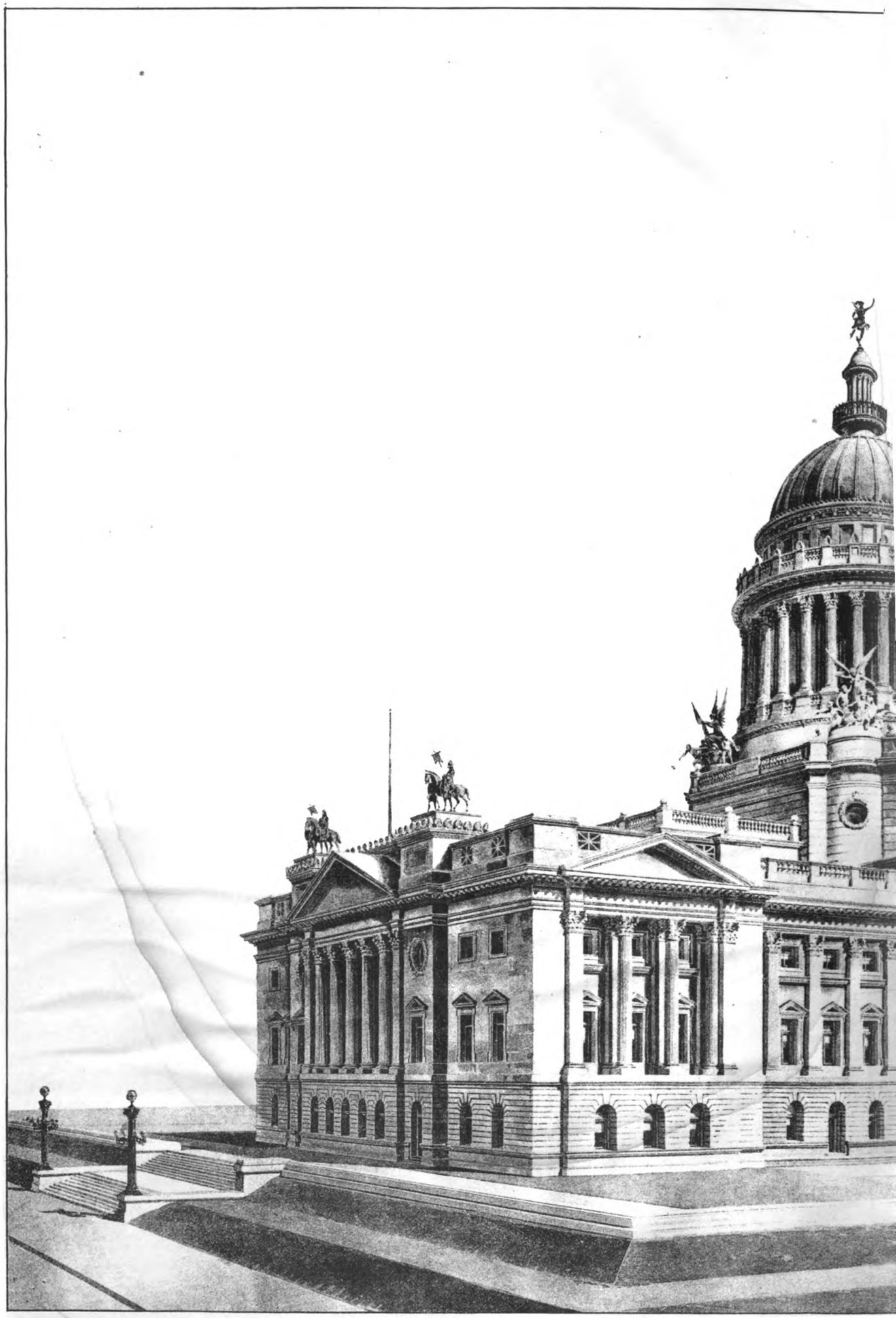
IVORY MARKETS. — Antwerp is the principal market in the world for ivory. In 1884, 582,177 pounds were imported. Prior to 1890 ivory markets were held annually at Antwerp; since that date, however, they are held every month. Merchants come from Germany, France and England. Of the three principal markets for ivory, Antwerp in 1894 took 410,066 pounds; London, 153,220 pounds; and Liverpool, 131,174 pounds. — *Boston Herald.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

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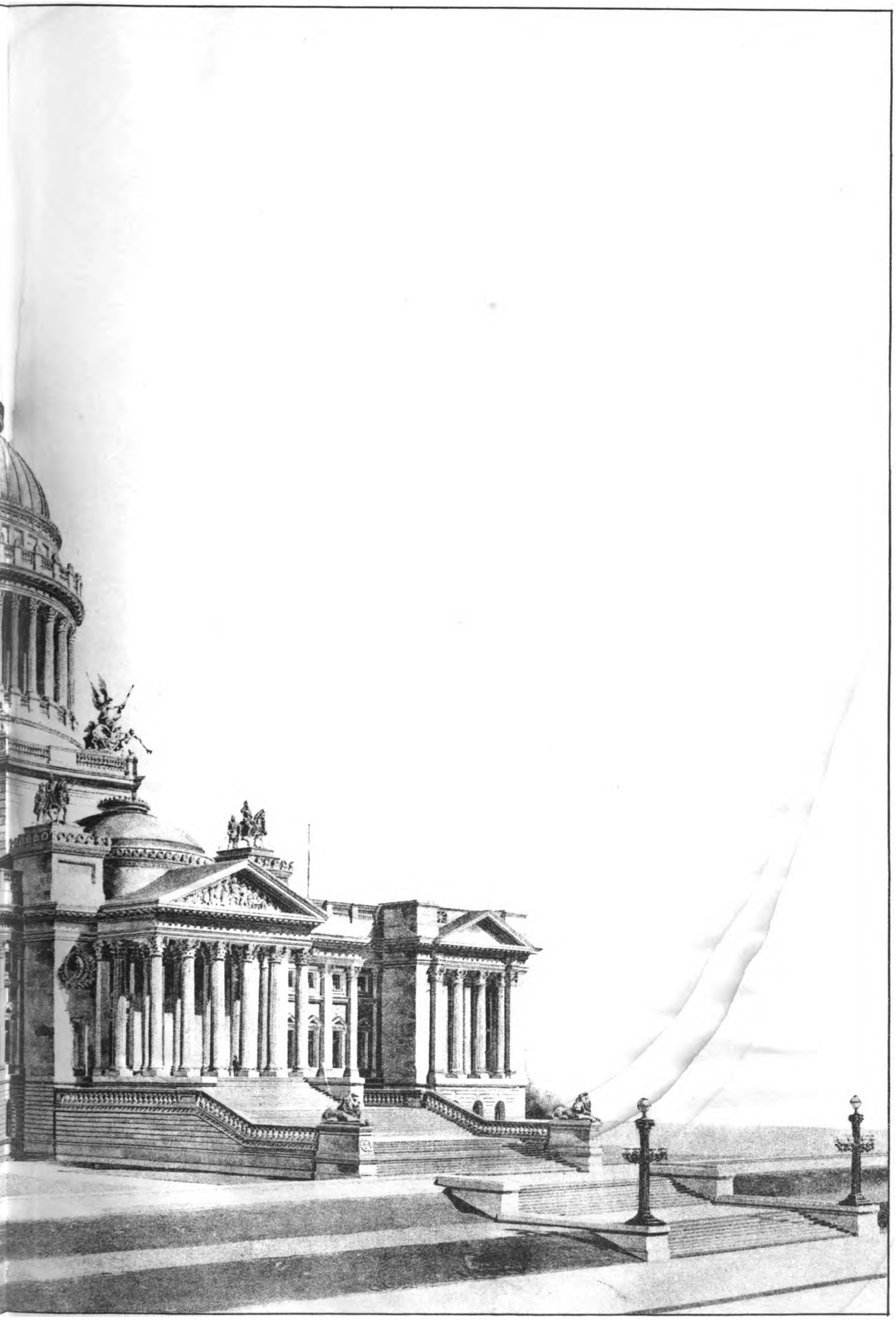


DESIGN FOR MINNESOTA STATE-HOUSE, S

H. T. E. WENDELL AND JOH

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THE ARCHITECT & BUILDING NEWS CO.



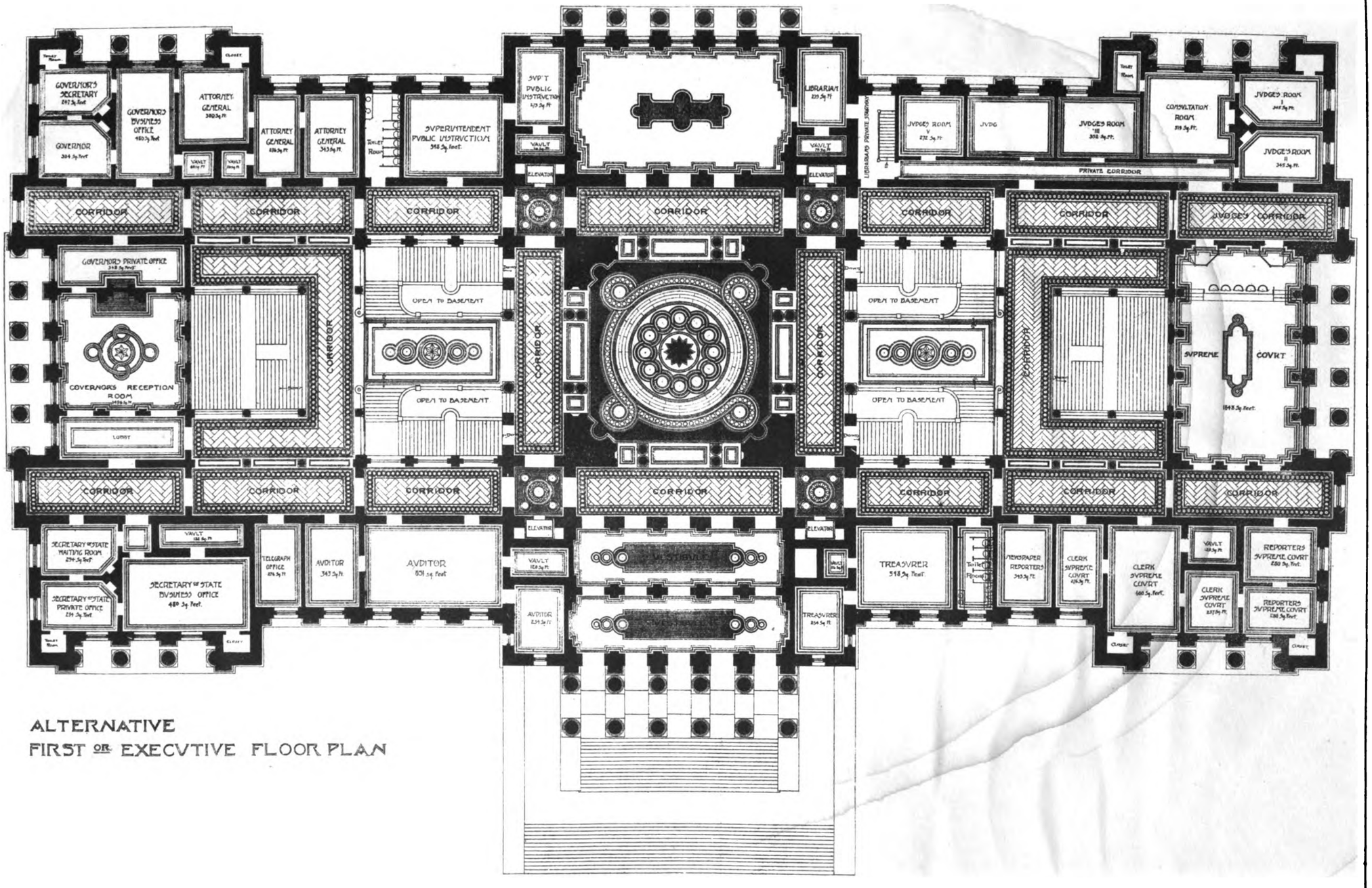
SUBMITTED IN THE SECOND COMPETITION.

J. HUMPHREYS, ARCHITECTS.

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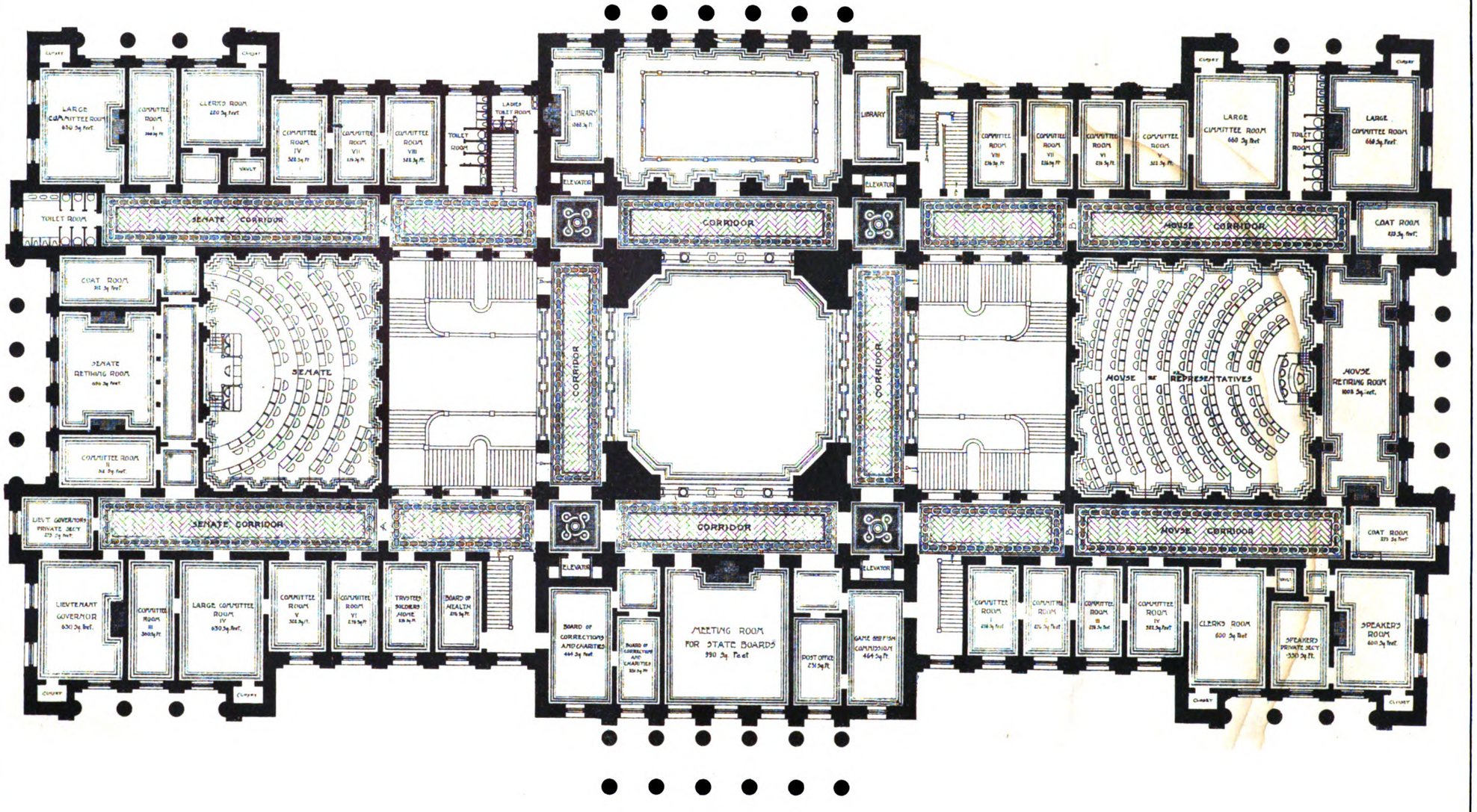
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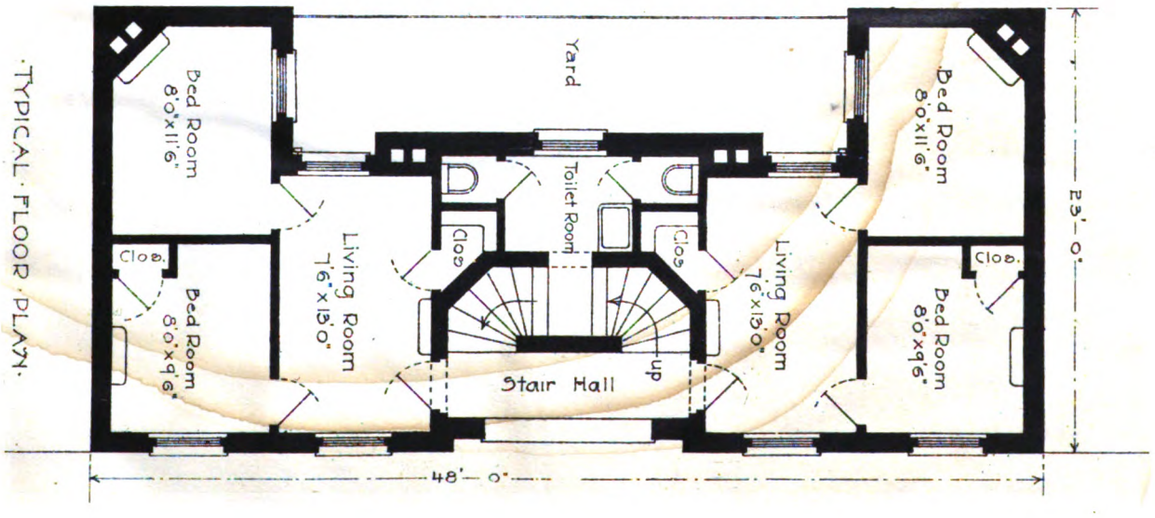
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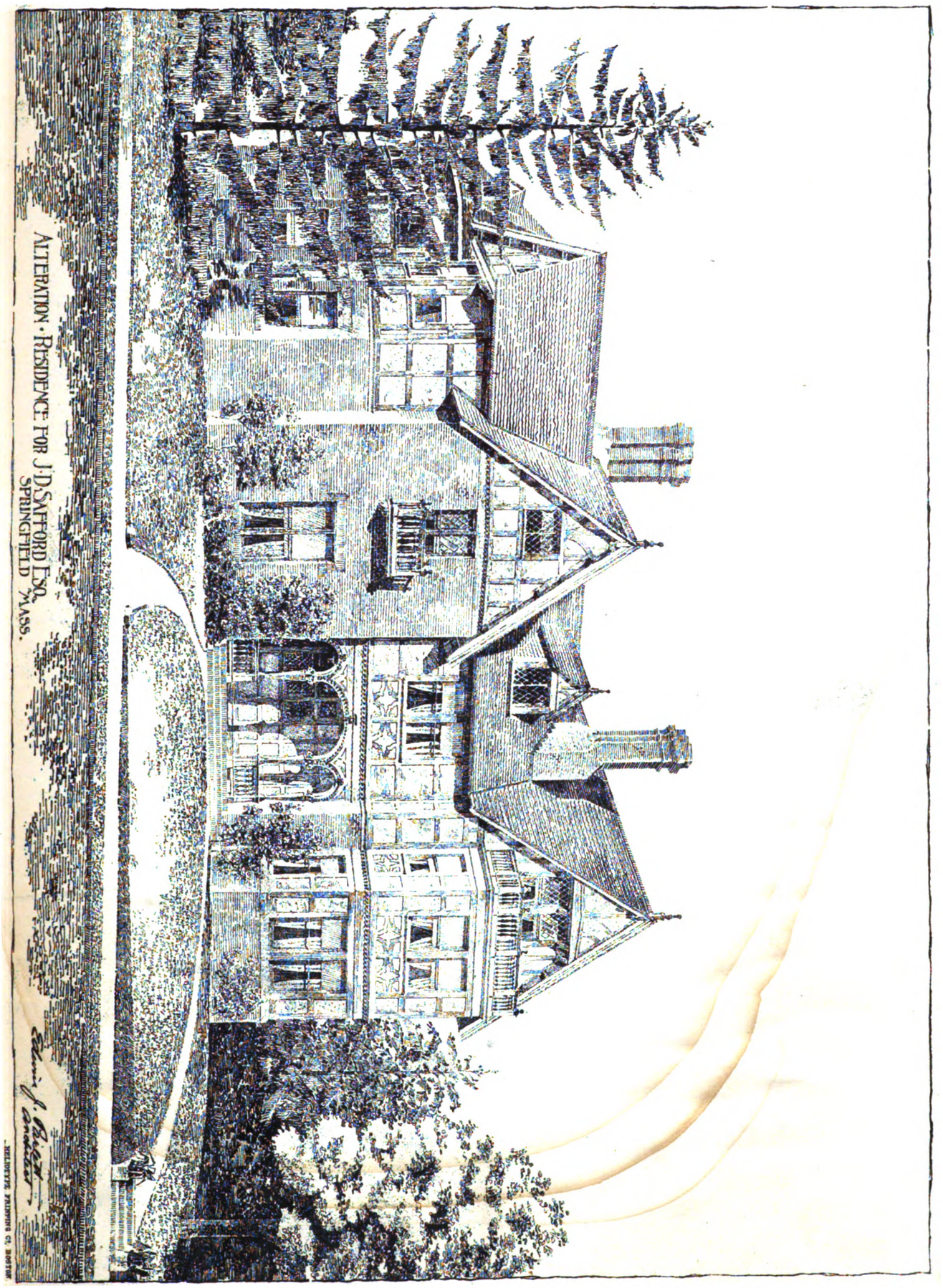
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THE artistic world of New York is a good deal stirred up just now over the Heine monument, which some public-spirited citizens desire to present to the city. It seems that the monument, which is in the shape of a fountain, was originally intended to be set up in Düsseldorf, where the poet was born; but the city refused to accept it, on account, as is alleged, of Heine's objectionable political views. After this, the United German Societies of New York took up the matter, and started a subscription for the purpose of buying the fountain and bringing it to this country. As it is now necessary to submit works of art intended for the public parks of New York to a committee of the National Sculpture Society, before they can be granted a place, photographs and plans were sent to the Society for the committee. The result of their deliberations was that they felt themselves "called upon to recommend . . . in the most explicit manner" the rejection of the fountain. The committee was nearly four months in reaching this decision, and, as the German Societies had gone on meanwhile with their collection of funds, they are, naturally, not too well pleased over the matter. However, a part of their plan for raising money consisted in holding a fair. This fair opened just after the judgment of the committee was announced; and its unexpected success, twelve thousand dollars having been realized for the fund, is attributed in part to the desire of the persons interested to make a sort of silent protest against the Committee's decision.

WHILE this affair was under consideration before the Park Commissioners, a communication was received from Mr. Alexander Doyle, a sculptor, protesting against allowing the National Sculpture Society, which, as he said, represents a certain class of sculptors, to pass official judgment upon the work of brother sculptors. As he truly says, the reputation of an artist should not be placed at the risk of malicious judgment by professional rivals; and while we should be the last to suspect the members of the Sculpture Society of anything like malice in their decisions, we have doubts whether Mr. Doyle has not good reason for thinking that a committee of sculptors is not the best jury to pass upon the selection of works of art for public places. Every one remembers the conviction to which Sir Joshua Reynolds came — that the best judge of pictures is the public; and that, while artists are almost always influenced by professional fashions, or training, or associations, or, as Mr. Doyle puts it, by their own ideals — which they never reach themselves, but expect other people to reach — the great mass of ordinary people, whom artists and connoisseurs affect to despise so much, often select, in the end, the works which best deserve immortality. It is true that the preliminary sifting by a jury of works offered for public places, a sifting which is necessary to prevent the available places from being appropriated by worthless objects, to the exclusion of better ones, does not necessarily interfere with a subsequent popular judgment — though passage of time often shows this to be seriously at fault — but it need not to assume to take the place of this judgment, nor should the public ever have reason to think that any set of men intends to dictate to it in matters of art.

THE strike of the housesmiths in New York is getting into the comic stage, so far as the spectators are concerned. The men themselves, or, at least, the more enterprising members of the union, seem to have left the city promptly on the declaration of the strike, and to be quietly endeavoring to get work in other places, for such wages as they can earn, out of reach of the pitiless claws of their own elected superiors; and, in the meantime, the contractors are, without much difficulty, getting non-union men to finish their contracts. Walking-delegate Lenahan, who was the most prominent instigator of the strike, is said to have approached one of the principal iron contractors, offering to allow his men to return to work for him, at the old wages, and under all the conditions previously existing, if he would "recognize the union." The "recognition" of a union by a contractor means, of course, an agreement on his part not to employ any man not belonging to it; and Mr. Milliken declined to become the tool of any such scheme of oppression. His buildings were, therefore, "picketed," and Mr. Lenahan seems to have gone around them, trying to persuade the new men to abandon their work. By the argument of a five-dollar bill, he succeeded in inducing some of them to leave the job; but it is rumored that some of the more ingenious of them did so with the private intention of going to work the next day for another picketed contractor, and getting another five-dollar bill for leaving him; and so on, as long as the union funds, available for this purpose, held out.

OUR readers will remember the Schuyler Monument case, which has been in the New York courts for some time, in which Philip Schuyler sought to restrain the officers and members of the association known as the "Woman's Memorial Fund" from "making or causing to be made or exhibited" a statue of the late Mary M. Hamilton Schuyler, his aunt, on the ground that "the right of privacy" would be violated by making or exhibiting such a statue of a deceased person without the consent of that person's living relations. The Special Term of the Supreme Court decided in favor of the plaintiff, and granted a perpetual injunction against the association, forbidding all its members and officers to make a statue in any form of Mrs. Schuyler, or to exhibit any such statue, or to solicit or to receive subscriptions in any way for any project of making or exhibiting such a statue "at the Columbian Exhibition or elsewhere." The case was appealed to the General Term, which affirmed the decision of the Special Term; and was again appealed to the Court of Appeals, which has reversed the previous decisions, dismissing the complaint with costs.

THE majority opinion of the Court of Appeals is written by Judge Peckham. The Court says, not without a spice of sarcasm, that "It may perhaps be somewhat difficult for the ordinary mind to perceive any reason for the plaintiff's distress, arising out of this contemplated action by women of respectability, who are desirous of honoring the memory of a woman whom they regarded in life as a friend and benefactor of their sex." Speaking of the plaintiff's claim that his action was taken in defence of the right of privacy, the Court says, "After taking all these objections into careful consideration, we cannot say that we are in the least degree impressed with their force. . . Whatever right of privacy Mrs. Schuyler had died with her. Death deprives us of all rights in the legal sense of that term. The right which survived . . . was a right pertaining to the living only." As to the rights of the living which were infringed, the Court held that, although Mrs. Schuyler herself might have objected to the publicity of a statue, her rights in the premises ceased at her death, and her relatives must show the violation of some right of their own. A proceeding which might have been disagreeable to Mrs. Schuyler was not necessarily an injury to her descendants; and the Court could not "credit the existence of any real mental

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injury or distress to a surviving relative, grounded upon the idea that the action proposed in honor of his ancestor would have been disagreeable to that ancestor during his life." The Court, therefore, considered the plaintiff's cause of action as "wholly fanciful," and says that "Upon the whole, we are of the opinion that the plaintiff has made a mistake in his choice of this case as an appropriate one in which to ask the enforcement of the right of privacy." Justice Gray, of the Court, presented a dissenting opinion, holding that a case had been made out "where equity was unfettered in its exercise by any legal principle, and where the decree of the court below should be affirmed."

A LABOR arbitration law has been passed in Illinois, which has some excellent features. Among these is a provision under which the Board of Arbitration will not intervene or act in any way, either to hear the parties or to announce its decision, unless both parties to the controversy continue at work. Employers who have locked out their men, or men who have taken the law into their own hands by striking, have no standing before the Board. This feature of the law, as might be imagined, assists materially the object which it has in view, by preventing the losses and resentments on both sides which are the inevitable result of any strike or lockout, and which often cause the postponement of an appeal to such a Board until both parties are reduced nearly to despair. Although the law was passed only last summer, about thirty labor controversies have already been settled. In all the cases but one an amicable arrangement was soon made, the Board having to exercise its authority for prescribing terms to the parties in a single instance only. One of the disputes settled was a serious one. In the town of Galesburg, some four or five hundred bricklayers struck last August, and remained idle for two months, neither the men nor their employers being willing to make any concession. At last, the men, in desperation, applied to the Board of Arbitration. A conference was arranged between the parties and the Board, and, after a few hours conversation, the whole affair was adjusted; the men went back to their work, and an agreement was adopted for fixing annually the scale of wages, which seems likely to prevent similar strikes for many years to come.

THE Labor Question seems to be just now in a somewhat unsettled condition. Mr. Debs, who once thought that the Labor Question was concentrated in him, has just been liberated from prison, and celebrates his release by roars and threats of the familiar old sort about how "Labor can make and unmake judges." and so on. However, notwithstanding this demonstration, he seems to have learned a useful lesson from his incarceration. The terrible railway strike, which he was supposed to be planning from his headquarters in the jail, has failed to develop itself, partly, no doubt, because some of the men who were to take part in it met in advance and resolved to have nothing to do with any strike, Debs or no Debs; and partly because Mr. Debs himself dislikes the solitude of "dungeons," and does not propose to put himself rashly in the way of being shut up again; and it may be safely assumed that, notwithstanding all the bluster to which we are likely to be treated, the overt acts of war against the peace and property of the people of the United States which may be perpetrated through the railroads will, hereafter, not be visibly directed by Mr. Debs. In another part of the country, it has been decided that grief on account of the oppression of "concentrated capital," or scorn of "the money power," do not justify people in pulling out railway spikes, or misplacing switches, for the purpose of throwing trains off the track; and some enthusiasts who expressed their sentiments in this way, and thereby caused the death of two men, have been held for trial for murder in the first degree, with an excellent prospect of suffering the death penalty. This is certainly an improvement on the state of affairs which existed a few years ago, when an insolent labor magnate could with impunity enforce his demands on a railway company for money, by "stopping every wheel on the line" unless his pockets were filled; and when high officials crawled before other reckless conspirators, offering them Government favor and position as a reward for their assaults upon the rights of citizens; and the labor leaders feel the change. At a "Convention" of the principal organization, held lately in Washington, the Supreme Court of the United States was denounced in such violent terms for its "travesty of justice" in the Debs matter, and for other misdemeanors, as to suggest the idea that the agitators were either driven to reckless despair by their prospects, or that some of them wanted to be made martyrs of by arrest for contempt of court. Of the two, the former is the more probable hypothesis, and the subsequent revolt and withdrawal of forty thousand members of the organization shows that unfavorable anticipations in regard to the future of the order were well founded.

THE doctors, like the engineers and the architects, are beginning to show serious dissatisfaction with the prevailing system of taking expert testimony before the courts. Dr. E. G. Janeway, of New York, in a recent paper on "Progress in Medicine," spoke of the discredit and annoyance which the profession suffers in cases where expert medical testimony forms an important part of the evidence. Very frequently, in such cases, the expert witnesses on the two sides express opinions diametrically opposite, bringing down upon themselves, and on their profession, the jeers of the opposing lawyers, and the contempt and suspicion of the judges, the jury and the public; while, in point of fact, they may be in perfect accord in their views of the subject about which they were questioned, and their testimony may have been based purely upon false hypotheses, artfully concocted for that express purpose by the attorneys. For example, we once knew of an accident case, where a man had been caught in a mass of falling earth, and carried home, apparently suffering from severe internal injuries. One of the people interested made the patient a visit of condolence a day or two later. As the door of the house was opened to receive him, he heard laughter and merriment within, and recognized the voice of his injured friend among the most hilarious of all. On his entrance the sounds of festivity were hushed, and he heard hurried footsteps; and, after waiting for some time in the hall, he was ushered into a darkened chamber, where the patient lay groaning in bed. Now, supposing this visitor to have been a medical expert, witness for the defence in the employers' liability suit which was soon afterwards instituted, while, after his departure, another physician, in charge of the attorney for the prosecution, had paid a visit to the agonized victim, how could the testimony of the two experts, at the trial, fail to differ? This is a comparatively simple case, but in practice, most expert testimony, given in support of one side of a controversy, under the guidance of skilful lawyers, who have ways of misleading and prejudicing a layman which the latter cannot understand, is given under misapprehensions of some sort, and is, so far, valueless. As we have often before suggested, the true remedy for this evil, which is every day becoming more serious, is to have expert testimony put under the control of the court. In France, all matters requiring such evidence are referred to experts designated by the judge, out of a certain number of skilled persons, who receive the appointment of "expert to the courts" as a reward of professional attainment. One such expert, accompanied, in important cases, by a second, proceeds to the place indicated by the judge, makes a perfectly impartial examination, and reports his conclusions; and on these conclusions the decision is usually based. The expert's fees, which are moderate in comparison with the total sums expended in this country by both sides for evidence of the sort, are paid by the court, and charged as a part of the costs of the case. There is no reason why such a system should not be adopted in this country; and, by coöperation of the professions most interested, including physicians, chemists, engineers and architects, it could probably be commended to the courts with some effect.

AS many architects have probably received from owners complaints of leakages of walls and roofs during the late severe autumnal storms, it may be of assistance to the younger practitioners, at least, to know that they may properly assure their clients that the experience of the best architects and builders shows that it often proves difficult to build a wall, or a roof, even under careful supervision, which will not permit water to enter to the interior during protracted storms accompanied by high winds. Even with the most careful work in filling masonry joints, minute cracks will occur, through which the water will penetrate, and these cracks are most difficult to detect. Great difficulty also is found in having the pointing of stone-work so done as to prevent penetration of water during driving storms. A cheap wooden house, shingled on the outside, can with ordinary care be made water-tight, but brick or masonry walls, even two feet thick, although built with special care, often prove to be very vulnerable to wind-driven storm water.

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ART IN THE MODERN CHURCH.[1] — VIII.

MODERN ECCENTRICITY.



Fig. 51.

SIDE by side with the over-development of the picturesque in our modern American churches there has been developed a strange feeling for the eccentric in design. Something new, something strange, something bizarre, odd, original, unheard of, has been the cry of our architects, if we may judge, as of course we are entitled to, from many of their works. Fearful, apparently, of following too closely the beaten track, these misguided people have striven to make tracks for themselves, setting up new styles, inventing new forms, devising new details, forming new combinations. The result is an utter strangeness, a barbarity of art, a grotesque architecture that from first to last is devoid of Christian calm and faith.

There was once a man — it is an old story repeated a thousand times every day — who had developed a certain business on a very large scale by following certain methods. In the process of time his son became associated with him, bringing "fresh blood" to the ancient enterprise. When the father died the infusion of "fresh blood" proceeded at such a tremendous rate, and so many new ideas and methods were introduced, that the business speedily diminished, until nothing was left, and even the "fresh blood" wore out.

This homely tale represents a condition of affairs that prevails in our modern church architecture in a very similar manner. In previous times a great and glorious Christian architecture was developed for the church. It was beautiful, it was refined, it was rich, it was Christian. It had all the characteristics of a noble religious art, and all the beauty of a profound æsthetic sensibility. It left nothing to be desired, either in the wealth of its materials or in the variety of its forms. As perfect an art, in its way, as any art produced by human hands, it was wholly complete in its developed form.

Yet the modern architect comes along with that vain self-consciousness of the ignorant, and hastily says: "This old art will not do for me: it is old; I am new: I will make for myself a new, a modern architecture, which will express not only my modern artistic feelings, but which will illustrate the modern church."

We all know how this striving for "modern" feeling in church architecture ends. We have seen how a feeling for the picturesque has led our architects astray; a search for the "modern" is equally delusive, and generally ends in the grotesque, the uncouth, the strange, the new; in anything that indicates a departure from the old, or which stands antagonistic to it.

Our modern life is a new life, we are told, our thoughts, ideas, manners, customs, ideals, are all new and modern. We have expunged the old from our existence; we hunger after the new, and long for the morrow that it may lead us farther on. Look at our inventions, our ingenuity, our modern devices! We live a modern life, and all that has not that quality must be thrust out of it. And so, because all things are new, we cannot have what we once have had. We must change our art as we have changed our speech and our ideas. Our buildings must conform to our life, and in this general renovation and modernizing the church cannot escape.

Now it is true that our life is new; that new elements are entering into it every day; that it is modern in the fullest and loftiest sense of the word. But does this change permeate everything? Do the trees and the plants of the field put forth modern leaves, and send out modern flowers in a new style of modern vegetation? We know, indeed, that the surface of the land and the distribution of the waters have varied in historic times, while geology tells us of tremendous changes that have taken place in the unnumbered ages of the past. But the changes we know to have occurred in nature within the last two thousand years or more are too inconsiderable to be considered in the rapid strides with which man's mentality has advanced or the speed with which his conquest over nature has proceeded. But amid all this change, be it great or small, God has remained One and Immovable. The God that is worshipped to-day in every Christian church throughout the world is the same God that spake unto Abraham and that was adored immediately after the Ascension by the Apostles. His nature has not changed; His mind has not altered; His ways have not taken on new methods. Mankind has changed, and its ways of approaching the Father and of worshipping Him; but it is the same God, ever the same, world without end.

It is true enough, though surely it is not a thing to boast of, that we have changed many things in our manner of worship. We put in comfortable pews that we may lounge in comfort while a high-priced orator descants on sundry moral virtues with a judicious regard for the feelings of his auditors. Many now think God can be worshipped only in listening to a sermon that shall nourish their souls, while the worship of the altar is looked upon as a thing accursed. Others, again, claim that God shall be worshipped according to the wishes and inclinations of the individual sinner, and no one form or method shall prevail to the exclusion of any other form. But these changes, the individual effects of which are not always small, are petty and insignificant beside the great fact of God's unchangeableness. A Christian may find many things to argue about in his religion, but he will not venture to debate this fundamental fact.

So God, being unchangeable, the notion of a modern religious conception of a modern religious life is a question that can scarce be argued save by those venturesome enough to ignore this basic essential. It is dangerous ground to enter upon, and its specific bearings are foreign to the topic we have in hand. It has, however, been needful to refer to this one element in modern thought in order to show how dangerous it is also to contend for a "modern" church architecture. Perhaps this is not the best way of putting the matter; it

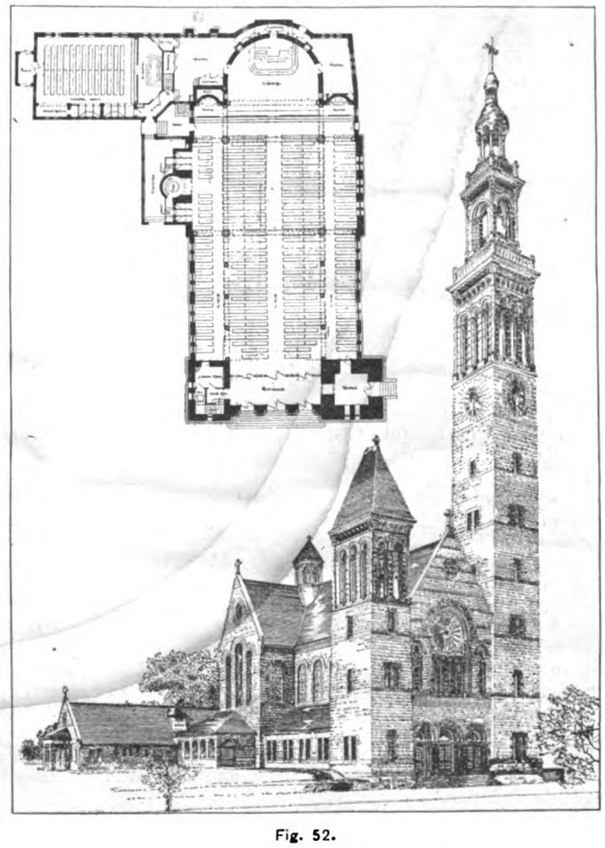


Fig. 52.

may not be the question of modern feeling in our church architecture as much as, What constitutes this modern feeling? This last is, indeed, a subtile question, since behind it lies the whole architectural question, What form of building shall we use? What style? What

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1040, page 98.

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detail? These points decided, it then becomes proper to inquire, What is meant by modern feeling in Christian architecture, and how may it be expressed in our churches? Yet, after all, the questions hardly call for a reply. God being Himself unchangeable and unalterable, why should we seek to thrust new ideas into our religious art because we have them in other forms of thought? We may modify our conception of man's duty towards God, but we cannot modify God's attitude towards man. It is clear, therefore, that God's house does not call for new forms with each doctrinal advance (if such things be), and we cannot hope to "modernize" church architecture by the introduction of new features, whose sole merit shall be their strangeness and their dissimilarity from what has been used before. The truth is, that all this strange demand for a "modern" church architecture rests on a mistaken notion that because the modern man has set himself up with all sorts of modern things, he must have a new God, and so must worship in a new sort of building.

Some notorious examples of the practical effect of such a demand may be seen in some of the new churches of France. The French architects pride themselves on their "advanced" position, and, doubtless, they are right in being the most modern of architects. France is so richly dowered with churches that opportunities to erect new ones are not as plentiful as with us, but the last few years have seen the erection of several important ones that are solemn warnings against the "modern" church idea. Take, for example,

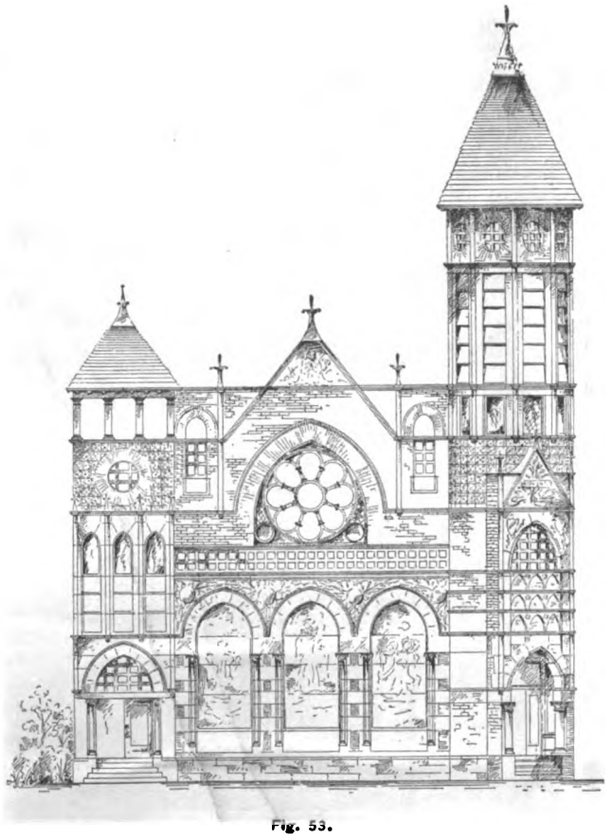


Fig. 53.

the new basilica of Notre Dame de Fourvières, on the hill above Lyons. A more frightful edifice it is hard to imagine. The proportions, the forms, the detail, all are new and up-to-date. There is nothing here that ever was before, and very strange and wondrous art it is. This church happens to be one of the most costly undertaken in France in the present generation. Money has not been stinted upon it. Carving, mosaic, precious marbles, gold have been lavished upon it in a princely manner. The resources of our age have been exhausted in adorning it, and in any other time it would have been a monument of contemporary artistic resource. Yet it is cold, ugly, pagan; it corresponds to no modern idea of art or of religion; it is an impossible church, and the more impossible because the amplest funds were to be had for making it a positive monument of our time. It is a thing to weep over and regret, and all because its author departed from the elementary spirit, forgot the meaning of a religious architecture, forgot even the significance of Christian ideals. Here, in truth, we have the modern conception of a modern church on the largest scale, and here, also, we have its utmost degradation.

I do not know a church building in America as bad as that of Our Lady of Fourvières; perhaps it is because we have not here anything so large and costly that may be directly compared with it. But in many of our churches we have that striving after novelty, that seeking after something new, that has been the ruin of the French basilica. It may be briefly described as a desire for the development of eccentricity. Many types of it may be seen in the churches we have passed in review. Not in every part, perhaps, but in every design that is strange and odd, some one feature, if no more, has been introduced for no apparent reason than to have something new, different, "modern."

But is our modern life filled with eccentricities? Are all our manifold and much-prized conditions characterized by strangeness



Fig. 54.

and difference from other things? The peasant of the Middle Ages could have imagined no stranger, odder or more undreamed-of means of transportation than to seat himself in a car of wood and be drawn at an inconceivable speed by a machine of iron. We do not feel, when we take a railroad journey, that we are doing anything uncommon; we do not feel, when we go to a theatre and seat ourselves in a comfortable orchestra stall that we are performing an eccentric act; we do not feel, when we pick up our morning newspaper and find there all the news of the world in briefest form, that we hold in our hands a miracle of strangeness, once unthinkable as well as unknown. Every thing we do that makes our life modern is done in an orderly manner, without thought of its distinctive quality, without a notion that we are making ourselves conspicuous. So, when we come to build a church, we will not make it modern by thrusting in new things that must be seen whether we wish to look at them or no; that cry aloud for attention, and that persistently thrust themselves forward in the memory when we fain would think of more delightful things.

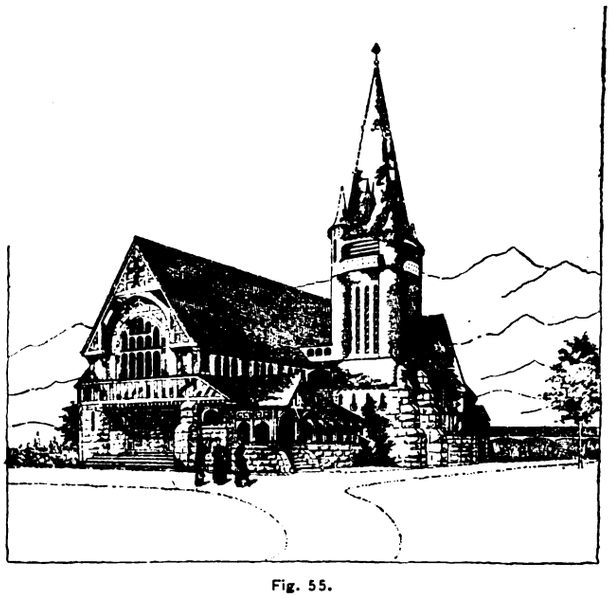


Fig. 55.

Strangeness, oddity, eccentricity have as little place in church architecture, be it old or new, ancient or modern, as paganism and infidelity have in Christian discourses. We cannot make our churches Christian by being eccentric in our ornament, or by being

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strange in our ideas. We cannot make them holy by branching out into new fields, and encrustating them with our individual conceptions. We cannot ignore the unalterableness of God, nor can we modify His relations to us. That all these things are attempted to

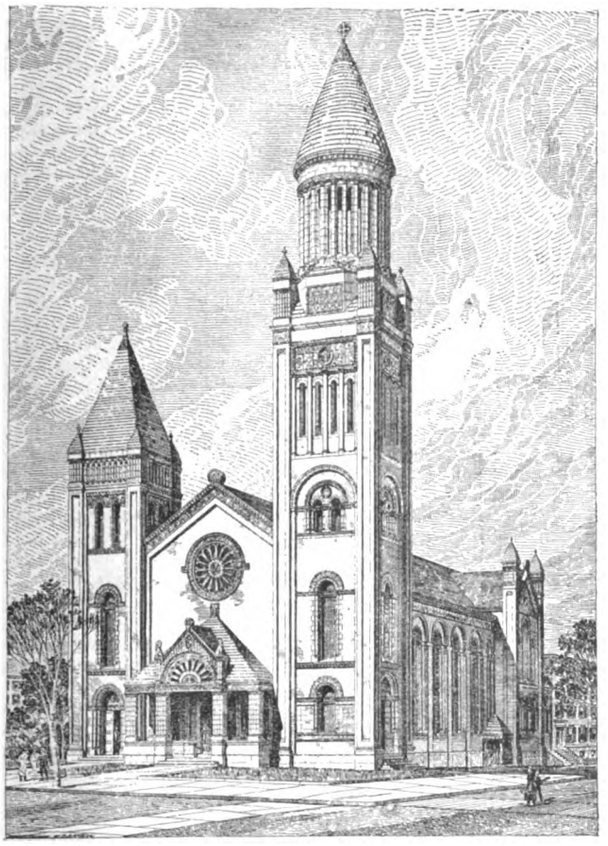


Fig. 56.

be done does not alter the fact of their impossibility or of their unreasonableness.

Some injustice may be done to a well-meaning (though ignorant) architect, in selecting a design as illustrating the eccentricity that may only be the result of a search after "modern" feeling. It is possible he was only doing the best he could, or was only using the small knowledge he had, and knew not otherwise nor the nature of his evil doing. Or a well-intentioned honest effort may, from want of an understanding of the true nature of Christian architecture, have ended in failure through sheer force of circumstances. Still, at the risk of attributing the results to a false cause, it is impossible to deny that there are many churches which may rightly be taken as eccentric in design or that indicate a desire for novel forms and combinations on the part of their authors, which strangeness may be attributed, in turn, to a wish to produce something new and modern.

The church shown in Figure 51 is a structure unlike any other church ever built, save another from the same hand in the same city. It is sufficient to illustrate one, as the resemblance between the two buildings is very close. It is impossible to characterize this design as Christian, where vivid coloring, clumsy forms, heavy detail and design in every part illustrate as wide a departure from Christian models as it is possible for an architect to take. And having left all behind him, and emerged on a path peculiarly his own, what has he accomplished? Is there aught in his design that appeals to any modern religious idea? Do these strange shapes seem more godlike or more in touch with our modern life than a church built in the traditionary style, and presenting a traditional appearance? The most advanced modern would, I should imagine, be loath to accept the art of this structure as typical of his time. It may be new, it may be original, it may be the latest expression of religious architecture, but certainly *this* cannot receive acceptance as modern, nor can it be regarded otherwise than as an eccentric freak, unhappily and permanently built in stone.

The design for a Roman Catholic church shown in Figure 52 is another extraordinary design that illustrates, to a painful degree, some unfortunate tendencies in our American churches. This is a strange, strange church, with a tower more strange still. It is possible the tower is modelled after the Giralda at Seville, a Mohammedan structure subsequently put to Christian uses. Its extraordinary length, as well as its marvellous top-piece, is the most striking thing in this creation; the rest of the building is so poor and ordinary as to seem only designed that the tower might rise until the cross upon the summit should cut the skies. Only a time that encouraged eccentricity and was ignorant of the first principles of Christian architecture would tolerate such a church design as this.

The "preliminary sketch for a church" (Fig. 53) offers another singular example, in which the authors have used the pointed opening of the Gothic style, but have produced a structure that could have been thought of in no other age than ours. Is it, therefore, modern? Verily, it would seem so, if utter unlikeness to the churches of previous times is the definition of a modern church building.

The next design (Fig. 54) — whether executed or not I do not know — is another singular design that is the product of an unfamiliarity with the traditional forms of architecture, of a desire to produce something new and "original," with a profound ignorance of the nature and function of Christian ideals. Again we have a design that could have been produced in no other epoch, and which must, therefore, be modern in every sense of the word.

Figure 55 belongs to a somewhat different category from the preceding examples. There is nothing repulsive or startling in it; on the contrary, it presents an *ensemble* of considerable picturesqueness. Yet its author so far forgot the purpose of a Christian church as to make his desire to obtain just this picturesqueness which should be unlike every other sort of picturesqueness, the end and aim of his work. And so once more we have a design that is modern — since no other age could have produced it — though it is redeemed from positive blemish by a considerable artistic feeling that unfortunately shows no Christian impulse.

The next church (Fig. 56) and the competitive design for a church (Fig. 57) may be grouped together. Both are by the same architect, though only the former has been erected, and both exhibit a considerable similarity in idea, the competitive design being, in a measure, an outgrowth of the other church. That the former is the more elaborate is evident, but whether it is an improvement need not be questioned. The point for us to consider is, Would these churches have been designed in this way had not their author been striving to be original, and endeavoring to produce what, in effect, would be a new type of church? The design for this church abounds in features of new form, and in cunning contrivances that bewilder in their variety. But are these buildings nobler on account of their pronounced individuality — or originality, if you will? Do they, in any way, correspond to a modern conception of religion? Do they make us better Christians, do they bring the power of God, His might and His love before us daily and hourly as we look at them? Do they increase our reverence? Do they help relieve our souls of their burden of sin?

Are they not rather the individual expression of the taste of the architect? Do they not represent exactly his own individual artistic conceptions, and nothing more nor less? Such, I think, will be admitted without debate. And on just such baseless, irreligious, irresponsible, personal grounds of taste and private predilection

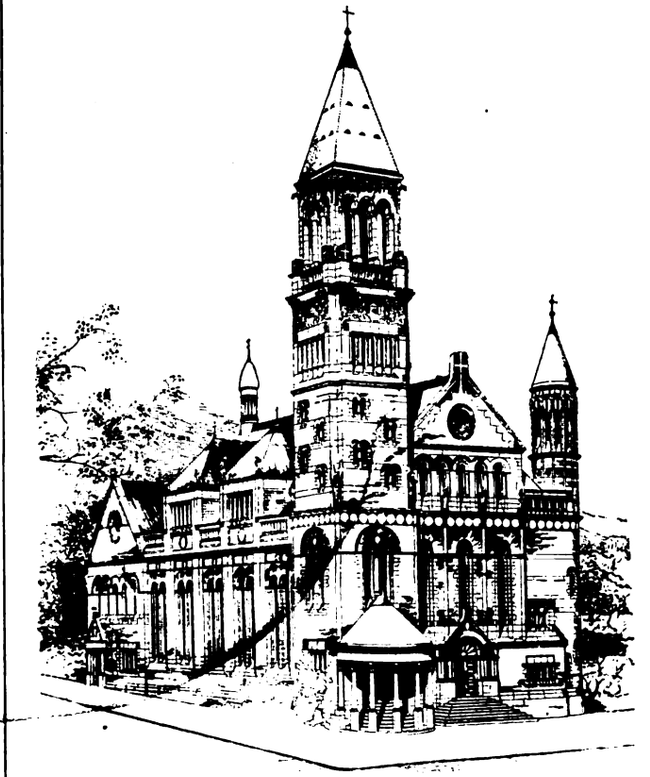


Fig. 57.

does most of our American church architecture rest. The architect who builds the tallest towers, who devises the widest vaults, who invents the most individual designs, who introduces the latest novelties in church architectural fashions — he is the man whose work is

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caught up and copied and built over our land. It is this unthinking, unreasoning ignorance of the nature of Christian architecture that has so lowered the architectural standard of our churches. One or two, here or there, may rise above the level of American mediocrity; one or two faithful souls may speak the truth understandingly, and build churches that are really Christian, and as sacred in their architecture as in the religion taught within their walls. But these are exceptional. The designs illustrated in this chapter and in the preceding chapters are designs of average churches. A study of them shows how low this average is, and how far American church architecture, as a whole, is from an appreciation of the value of Christian art, or even from an understanding of its meaning.

Barr Ferree.

[To be continued.]



LONDON

VAUXHALL BRIDGE. — INTERMITTENT WATER-SUPPLY AT THE EAST END. — PROPOSED WATER-SUPPLY FROM THE WELSH HILLS. — THE BRITISH SCHOOL AT ATHENS. — THE PROPOSED STREET FROM HOLBORN TO THE STRAND. — THE ROMAN CATHOLIC CATHEDRAL. — THE ELECTRIC UNDERGROUND RAILWAY. — THE CHURCH OF ST. SAVIOR, SOUTHWARK.

VAUXHALL Bridge, which spans the Thames not far above Westminster, is about to be rebuilt, and it seems possible that London will be the richer for a bridge of some architectural merit. But, as in other cases, the engineers are not quite at one with architects on this question. The circumstances are much as follows: the Bridges Committee of the London County Council invited the R. I. B. A. to submit a design for the bridge. This was done under the superintendance of the Art Committee of the R. I. B. A., and though the plan has not yet been made public, there is reason to believe from current report that the design was of good character and not without effective treatment of mass and shadow. It may be said that the design suggested by the County Council Engineers for the constructional ironwork was fully adopted in the Institute design. It appears that the engineers also have produced a design of the bridge as a whole, though we cannot think at an equal expense of thought for appearances. The decision of the matter lies in the hands of the Bridges Committee of the County Council and advocates will certainly not be wanting to push the claims of both proposals. Architects must rest content that the designs will be judged on their intrinsic merits — and with the consolation that at least an effort has been made to suggest the possibility of a bridge possessing beauty as well as strength and durability.

Much interest has been taken in the inquiry lately held by order of the Local Government Board into the reasons for the deficient supply of water in the eastern districts of London throughout the greater part of the summer. The East London Water Company, which supplies the districts in question, is one of the greatest of the companies, serving a population of about a million and a quarter. The supply, originally intermittent, afterwards became constant, and in consequence storage cisterns were almost universally given up. When, therefore, the supply was cut down in the heat of the summer to a service of two hours a day, verv real distress resulted. As is not unusual in such inquiries, the evidence given as to the reasons of the failure and the effects of the lack of water, is contradictory. On the one hand, the London County Council and the parties who are anxious to bring the water companies to a higher state of efficiency state that the lack of water was due to the negligence of the Company in not hastening to repair the mains which the severe frost of last winter had seriously damaged. They further charged the Company with discriminating between those of their consumers who paid for water by metre and those who simply paid the water-rate; that whereas the latter were reduced to a very small supply daily, the former continued in the enjoyment of a constant supply. Medical evidence was produced to prove that the death-rate of the districts affected was abnormally high last summer, and that this was due to a great extent to the lack of a proper water-supply. On the other hand, the Company declare that all their broken mains were repaired by April 19th, and that in view of the fact that the chief complaints concerned the months of June, July and August, the waste of water actually took place upon the consumers' premises. Not only was alleged delay on the consumers' part to repair their several pipes and fittings, but a constant and habitual negligence in the management of their taps and other points of supply. The amount of water pumped into the pipes during the period was greater than the average, both in the aggregate and per head of consumers. The Company would excuse their own action in maintaining the constancy of the supplies metrically registered, by the statement that had these also been restricted, factories and other establishments of the like nature must have been closed, producing undoubtedly widespread loss and distress. Further medical evidence went to show that, when compared with the returns for the Company generally, there was nothing exceptional in the death-rates of the eastern districts of London for the summer months, and that the intermittent supply had had no material effect upon the public health. Finally the Company stated that drought in the districts from which they drew water had greatly affected their supplies, that had not the County Council systematically opposed all the schemes laid by the Company before Parliament for securing additional storage-capacity, no difficulty would have arisen in meeting all demands. Such is the evidence the Local Government Board Inspectors are called upon to consider and their report will be awaited with no little interest.

This failure of the East London supply, and the unsatisfactory nature of the metropolitan supplies generally, has brought into prominence a scheme for bringing water to London from Wales. The County Council in July last agreed to the expense of £2,500 in making surveys and obtaining other information as to the feasibility of this project. The report which has just been presented is entirely favorable, though the surveying is not yet so far advanced as to render possible a detailed estimate of the cost of the scheme. Broadly, it is proposed to collect the water in the Welsh Hills and carry it by aqueduct to the outskirts of London, a distance of 150 to 170 miles. Here would be formed reservoirs capable of storing a supply sufficient for sixteen days — thirty-two hundred million gallons; this is at a rate of two hundred million gallons daily, an amount, as a matter of fact, by several million gallons in excess of the quantity at present supplied daily by the eight Metropolitan Water Companies. The approximate estimate has been drawn up, including a liberal margin for contingencies; the total amount required to bring to London two hundred million gallons daily being £18,000,000. This at starting is considerably less than the present water companies are willing to take for their undertakings; and, moreover, the following advantages are claimed for the new scheme. The Thames and the Lea would be left in possession of the whole of their waters, increasing their cleanliness and flow, thus improving the health of London. Nearly all expense of pumping would be saved, as the force of gravitation would, with very few exceptions, be ample to serve the metropolis. London would gain a supply of purer and softer water than at present, at a less cost, the works being in the hands of the municipality. Eventually, and in view of the continuing increase of the population of London, it is proposed to make a second aqueduct to the south of the first, to guard against a break-down from any cause arising. This second aqueduct would discharge into reservoirs to the south of London; the two systems of reservoirs, it is confidently asserted, would render any extension unnecessary for several generations of almost abnormal increase. But this eventual plan, which completes the whole scheme, would raise the total cost near to £40,000,000, so that for the present, half the scheme only will be seriously considered. The County Council hopes to lay the whole plan before Parliament within twelve months.

Mr. Alma Tadema, R. A., in an interesting little address, delivered to the students of South Kensington Art School, has laid great stress on the intimate relations between knowledge and art. "Art is not spontaneous; art is not so much the outcome of an individual brain, as it is the continuity of experience which, concentrated in one specially gifted brain, produces those incomparable artists who are the crowning features of their time and country." The finest sculptured work of the Greeks and of the Italian Renaissance showed the deepest knowledge of their subject and an indisputable mastery over anatomy. "To know," said Mr. Tadema in his concluding words, "enables one to render; not to know enables one to blunder; to know enables one to teach, but who can teach without knowing?" Those who will disagree with him in his contention that study is the foster nurse of art must be few in number; so that undoubtedly the sympathies of artistic circles of Great Britain lay strongly with the enthusiastic meeting called to consider the financial position of the British School at Athens. This is undoubtedly in a seriously handicapped condition when compared with the similar institutions which your country and the Governments of France and Germany so generously support. Lack of funds has not only prevented the possibility of granting scholarships from the great universities, but, more serious still, has put excavation and exploration practically out of the range of possibility. The subscription-list of last year included some eighty subscribers only, and the subscribed income was about one-quarter of the annual income enjoyed by the German School, one-sixth of that of the French. H. R. H. the Prince of Wales presided over the meeting, which included representatives of all branches of British art and learning. One of the most satisfactory announcements was to the effect that the late Government before resigning had settled upon the School a grant from the Public Funds for five years, and this step the present Government is willing to confirm. The gift has turned out to be £500 per annum, a sum of such magnitude that while it will be in the highest degree welcome and valuable to the school, will not militate against the generosity of private individuals. It is upon the latter that most of English institutions of this nature find their foundation; it is sincerely hoped that this meeting may have roused enthusiasm and proper generosity amongst monied scholars, archæologists and others, and that the work henceforth performed by our representatives in Greece may be on a fitting scale, and more worthy to rank in importance with the achievements of the other schools.

Movement has again been made respecting the proposed new

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street from the Strand to Holborn, the two most important arteries running westwards from the city. The communication north and south between these streets is at present altogether obscure and inadequate, while such a thoroughfare as is now proposed would in every way meet the long-felt want. Leaving the Strand near the Law Courts the proposed road runs northwards at a width of ninety feet, while several spur streets upon the main avenue will be obtained by widening existing streets. The property through which it will run is, of course, very valuable from its central situation; on the other hand, the buildings are poor and crowded, and the whole district will be improved by the alteration. A feature of this road is one which no doubt will appear in every important thoroughfare hereafter laid down — there is to be a subway throughout the whole length of the street for the accommodation of pipes, wires, etc. The cost of the work is estimated at £150,000, while the amount of compensation for acquisition of property reaches £1,943,200. The total expenditure then will be over two millions sterling, and this does not include the cost of housing some four thousand people who will lose their homes in the alteration. The scheme is ambitious and has not yet been sanctioned by Parliament. But it is an improvement that has long been necessary, and a definite conclusion of the preliminaries will be welcomed by all parties.

Cardinal Vaughan has laid the foundation-stone of a building of high importance to the Roman Catholic Church. This is the new cathedral at Westminster. The architect is Mr. John F. Bentley, who, though best known in work of a Gothic type, has shown himself by the thoughtful restoration of more than one of our city churches to be equally capable in dealing with the Renaissance style. The original wish was that the Cathedral should follow the earlier basilican type, but after long study and careful thought, Mr. Bentley reached the conclusion that this type is unsuited to modern treatment and London requirements. Instead, a Byzantine feeling has been adopted and the cathedral, which will be of considerable proportions, will be chiefly remarkable for its plain breadth of treatment. The detail will be sparingly disposed, and carving will be almost exclusively applied to the deeply recessed great doorway and the capitals of the internal columns. But although the interior decoration is to be of a flat type, it will not be the less gorgeous on that account. Marble lining, figure and Arabesque mosaic-work and painting will eventually leave little of the interior space undecorated. In English ecclesiastical architecture the adoption of the Byzantine style is a distinct experiment, and it is chiefly on this account that the building will be of more than passing interest. It is to cost £150,000, of which one-half is already in hand. The shell of the building is being executed as rapidly as possible, the decoration following as funds permit.

In my last letter I introduced to your notice the new electric railway that is being constructed beneath the river Thames, and which will connect the centre of the City with Waterloo railway-station. I then told you that the City terminus of that railway would be placed at a point close to the Mansion House, and that this same terminus would also be used as such by the Central London Electric Railway. The latter scheme has now been properly formulated and the £3,000,000 required for the undertaking were subscribed with remarkable readiness. The scheme is much as follows: starting from the Mansion House there will be two tunnels running close together westwards for a distance of about six and one-half miles to Shepherd's Bush; this is a district towards the outskirts of West London. There are to be fourteen stations, so that the points of contact with the upper world will be as frequent as is the case with our present underground railway. The system of working the tunnels will be by means of the "shield" which has proved so successful in the Blackwall Tunnel and the tunnels I endeavored to describe to you in my last letter. That the new railway will interfere with the traffic of the ordinary Underground Steam Railway from the extreme west seems certain, but the system on which the original "Underground" was constructed, the "Inner" and "Outer Circles," is one which lines from within, cross-radiating from something like the common centre of the "circles," can never seriously affect. In fact, only when the lines of radiation are running towards all points of the compass will our ideal web of communication be woven. Perhaps not the least advantage to the general public appears in the fact that the Company have undertaken at their City terminus so to construct subways connecting all the principal abutting streets, that pedestrian traffic will find no check and that the flow of passengers to and from the trains will not impede the vehicular traffic. No stranger can fail to be impressed with the normally congested condition of the traffic at this point, the true centre of the City; and if by descending and ascending a few steps, the foot-passenger of the future will be spared all the annoyance and danger of steering a course through endless streams of omnibusses and cabs, he will owe a debt of gratitude to the promoters of the Central London Railway.

For lack of funds the restoration of one of our most important mediæval buildings in London, second, indeed, only to Westminster Abbey is practically at a standstill. I refer to the Church of St. Savior, Southwark. This church is of very early foundation, dating back quite to the beginning of the twelfth century. Early in the nineteenth century the old nave was taken down and a structure erected in the "Churchwarden Gothic" style. The church, structurally and historically, is of the deepest interest, and while it is a matter of congratulation that the work has already progressed so far, it is, notwithstanding, a pity that the completion should not be immediately possible. Sir Arthur Blomfield is doing the work of restoration and already £25,000 have been spent on the tower and the rebuilding of the nave on the lines of the original. Nearly as much money, £22,000 in fact, is now needed to restore the transepts and fit up the church for public worship; £5,000, however, will go a long way towards furnishing the essentials for the latter. There is a sum of £3,000, in promises, not yet due, and it is hoped that the further £2,000 may be obtained without very great difficulty. Once the church is in condition for public service, there should be no further delay in obtaining all supplies that may be necessary; for the church will almost certainly become a cathedral for a new diocese to include the southeastern district of London, and invested with such dignity cannot fail to gather the sympathies of all who are brought into contact with it.

EMPLOYER AND EMPLOYÉ UNDER THE COMMON LAW.[1]

THE relations existing between employers of labor and their employés, and the reciprocal duties, obligations and rights growing out of those relations, are, in the absence of legislative enactments, governed by the common law in regard to master and servant, the words "master" and "servant" being legally synonymous with the words "employer" and "employé."

The common law consists of principles, usages and rules of action, applicable to the government and security of persons and property, which have grown into use by gradual adoption, without legislative authority, and have received, from time to time, the sanction of the courts of justice.

The great body of the common law of the United States consists of the common law of England, and such statutes thereof as were in force prior to the separation of this country from England, and applicable to circumstances and conditions prevailing here. These laws have been adopted as the basis of our jurisprudence in all the States except Louisiana, and many of the most valued principles of the English common law have been embodied in the constitutions of the United States and the several States.

In many details, however, the common law of the United States now differs widely from that of England by reason of modifications arising from different conditions and established by American adjudications. That branch of the common law governing the relation of master and servant has undergone some changes, although in the main it is the same in this country as in England. It is not the purpose of this article to point out such changes or differences, but to state the principles and rules of the common law now prevailing throughout the United States, except where they have been changed or modified by legislative enactments.

The statement which follows is derived from articles in the American and English "*Encyclopedia of Law*" on the subject of "Master and Servant" and kindred topics, and from standard legal works treating of the subject under consideration. The reader should bear in mind that any rule or principle of the common law, as given in this statement, conflicting with a statute which has not been declared invalid or unconstitutional by the courts, is modified or changed by the statute, and that the statute instead of the common law now governs.

Master and Servant: Definitions. — A master is variously defined as one who has in his employment one or more persons hired by contract to serve him either as domestic or common laborers; one who has the superior choice, control and direction, whose will is represented not merely in the ultimate result of the work in hand, but in all its details; one who is the responsible head of a given industry; one who not only prescribes the end, but directs, or may at any time direct the means and methods of doing the work; one who has the power to discharge; a head or chief; an employer; a director; a governor.

A servant is one who is employed to render personal service to his employer otherwise than in the pursuit of an independent calling, and who, in such service, remains entirely under the control and direction of the latter.

The Relation: Its Creation and Existence. — The relation of master and servant is created by contract, either express or implied, where both parties have the requisite legal qualifications for entering into a valid contract. The relation exists only where the person sought to be charged as master employs and controls the other party to the contract of service, or expressly or tacitly assents to the rendition of the particular service by him. The master must have the right to direct the action of the servant, and to accept or reject his service. The relation does not cease so long as the master retains his control or right of control over the methods and manner of doing the work, or the agencies by which it is effected. Furthermore, the relation exists where the servant is employed, not by the master directly, but by an employé in charge of a part of the master's business with authority to engage assistance therein.

The Contract of Service. — A contract of employment is one by which an employer engages an employé to do something for the benefit of the employer, or of a third person, for a sufficient consideration, expressed or implied. The authority of a subordinate to employ an agent or servant includes, in the absence of restricted

[1] A paper by Victor H. Olmsted and Stephen D. Fessenden published in the *Bulletin* of the United States Department of Labor.

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words, authority to make a complete contract, definite as to the amount of wages, as well as to all other terms.

Ordinarily, when an adult person solicits employment in a particular line of work, the solicitation carries with it an implied assertion that the one seeking employment is competent to perform the ordinary duties of the position sought; and it is an implied condition of every contract of service that the employé is competent to discharge the duties of his employment.

A servant is presumed to have been hired for such length of time as the parties adopt for the estimation of wages; for example, a hiring at a yearly rate is presumed to be for one year; at a daily rate for one day; a hiring by piece-work, for no specified time; but such fact does not, in the absence of other evidence, necessarily fix the period of hiring. Where an employé has been hired to work by the week or month, the burden of proof is upon him to show any change in the contract of employment as to the term of service.

It is a general rule that where a person enters into a contract of service for a fixed compensation, he, *prima facie*, agrees to give his employer his entire time; but this rule is not inflexible.

A contract for service running for a longer period of time than one year, to be valid, must be in writing and signed by the party against whom it may be sought to be enforced, or by his authorized agent.

In the absence of an express contract of hiring, a person may recover compensation for services where the same were rendered under such circumstances as to show that he expected such compensation as a matter of right, and that the person for whom they were rendered was bound to know that he claimed compensation, or was legally entitled thereto. Where one person performs labor for another, a request and a promise to pay the reasonable worth of such labor are presumed by law, unless it is understood that the labor is to be gratuitously performed, or it is performed under such circumstances as to repel the presumption of a promise to pay.

Where there is an express contract the servant must be furnished with employment by the master during the period covered by its terms. If by the terms of the contract the servant is employed to work by the day, week, month or year, and nothing is said as to the time of payment for his services, the wages are due and may be demanded at the close of each day, week, month or year, as the case may be; but in such case, as upon all questions relating to the interpretation of contracts, custom has a strong bearing.

A man can contract to furnish his own services and those of his wife, and if she makes no separate claim can sue for them; and if such contract needs ratifying, the testimony of the wife in support of his demand will be a sufficient ratification.

A wife is not responsible for the wages of her husband's employé, notwithstanding the fact that she sometimes pays such wages.

When a master agrees to pay his servant what he considers the servant's services to be reasonably worth, or, where he agrees to pay the same wages as shall be paid to other men in his employ filling similar positions, and there is no showing that the master has other employés in similar positions, the servant is entitled to recover, in a suit for wages, what his services were actually worth. And where the master and servant agree as to the existence of the contract of service, but disagree as to the wages to be paid, the question of compensation must be left to a jury.

Unless otherwise agreed, the wages of an employé must be paid in cash. The master has no right to handle, or invest, or in any manner apply such wages, whether beneficial to the servant or not, but must pay them directly to him.

An employer may discharge an employé before the expiration of the term of service stipulated in the contract for good and sufficient cause, as for incompetency. The discharge must be couched in such terms as to leave no doubt in the employé's mind of the employer's desire to terminate the relation.

In a majority of the States a contract for service for a specified time is considered apportionable, and an employé who has been discharged for cause is entitled to compensation for the work he has actually performed.

Where one has contracted to employ another for a certain period of time, at a specified price for the entire time, and discharges him wrongfully before the expiration thereof, the wrongfully discharged employé is entitled to recover an amount equal to the stipulated wages for the whole period covered by the contract, less the sum earned, or which might have been earned in other employment during the period covered by the breach. Upon dismissal, a servant, under the law, must seek other employment, but extraordinary diligence in such seeking is not required of him. He is only required to use reasonable efforts, and he is not bound to seek employment or render service of a different kind or grade from that which he was engaged to perform under the violated contract, nor to seek employment in a different neighborhood; and if he fails to secure employment and works on his own account, the value of such work cannot be deducted from his claim.

Where an employé for a fixed period, at a salary for the period, payable at intervals, is wrongfully discharged, he may pursue one of four courses:

1. He may sue at once for the breach of contract, in which case he can only recover his damages up to the time of bringing the suit.

2. He may wait until the end of the contract period, and then sue for the breach.

3. He may treat the contract as existing, and sue at each period of payment for the wages then due.

4. He may treat the contract as rescinded, and sue immediately for the value of his services performed, in which case he can only recover for the time he actually served.

An employé is entitled to recover damages from a person who maliciously procures his discharge, provided he proves that the discharge resulted in damage to him.

An employer is entitled to maintain an action against any one who knowingly entices away his servant, or wrongfully prevents the servant from performing his duty, or permits the servant to stay with him and harbors such servant with the intention of depriving the master of his services.

Combinations and Coercion of Servants. — Every one has the right to work or to refuse to work for whom and on what terms he pleases, or to refuse to deal with whom he pleases; and a number of persons, if they have no unlawful object in view, have the right to agree that they will not work for or deal with certain persons, or that they will not work under a fixed price or without certain conditions.

The right of employés to refuse to work, either singly or in combination, except upon terms and conditions satisfactory to themselves, is balanced by the right of employers to refuse to engage the services of any one for any reason they deem proper. The master may fix the wages, and other conditions not unlawful, upon which he will employ workmen, and has the right to refuse to employ them upon any other terms. In short, both employers and employés are entitled to exercise the fullest liberty in entering into contracts of service, and neither party can hold the other responsible for refusing to enter into such contracts.

It has been held, however, that employés in separate, independent establishments have no right to combine for the purpose of preventing workmen, who have incurred the hostility of one of them, from securing employment upon any terms, and by the method commonly known as "blacklisting" debarring such workmen from exercising their vocation, such a combination being regarded as a criminal conspiracy.

On the other hand, a combination of employés having for its purpose the accomplishment of an illegal object is unlawful; for instance, a conspiracy to extort money from an employer by inducing his workmen to leave him and deterring others from entering his service, is illegal; and an association which undertakes to coerce workmen to become members thereof or to dictate to employers as to the methods or terms upon which their business shall be conducted, by means of force, threats or intimidation interfering with their traffic or lawful employment of other persons is, as to such purposes, an illegal combination.

Unlawful interference by employés, or former employés, or persons acting in sympathy with them, with the business of a railroad company in the hands of a receiver, renders the persons interfering liable to punishment for contempt in court.

Employer's Liability for Injuries of Employés. — Where a person employs an independent contractor to do work for him, and retains or exercises no control over the means or methods by which the work is to be accomplished, he is not answerable for the wrongful acts of such contractor; and the same rule governs as between a contractor and a subcontractor. Under these circumstances an employer would not be liable for an injury sustained by a workman in the course of his employment for which he would have been liable had the work been performed under his own direction.

An employer is ordinarily liable in damages to his employé who sustains an injury through the employer's negligence. Such negligence may consist in the doing of something by the employer which, in the exercise of ordinary care and prudence, he ought not to have done, or in the omission of any duty or precaution which a prudent, careful man would or ought to have taken.

An important duty on the part of a master is to furnish his servant with such appliances, tools and machinery as are suited to his employment and may be used with safety; and if a master fails to use ordinary care in the selection or care of such appliances his ignorance of a defect therein will not excuse him for liability for an injury caused thereby; he is responsible for all defects in machinery or appliances of which he should have known, but failed through negligence to learn of, or which, having learned of, he has failed to remedy.

A railroad company is liable for injuries to its employés occasioned by the company's negligence in failing to keep its track or road-bed in proper condition; but such company is not bound to furnish an absolutely safe track or road-bed, its duty only being to use all reasonable care in keeping them in safe condition.

A railroad company is likewise liable if it fails to keep its track clear of obstruction and structures dangerously near the same; but such company is not negligent because it erects and maintains structures and contrivances for use in the operation of its road merely for the reason that they may be dangerous to employés operating the company's trains.

It is negligence for such a company to fail to use safe and appropriate engines; or to have the boilers of its engines properly tested; or to furnish suitable freight or passenger cars, and proper and safe attachments and appliances to be used in connection therewith; and such company cannot divest itself of its duty to use due care and diligence with respect to the cars of other companies to be moved and handled by its employés, in seeing that such cars are in safe

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condition to be so moved and handled, by contracts with such other companies that they shall keep their cars in repair.

It is negligence in such a company to permit its employés to disobey its orders, and it is liable for injuries arising from the careless or reckless running of its trains, or the starting thereof without notice, or the running of its trains at immoderate speed.

Railroad companies, and employers of every description, are negligent if they fail to protect a servant who is exposed to danger; but such a company is not absolutely bound to take all possible precautions against storms, or against washouts, landslides, or other obstructions which may be dangerous to its employés. And if the mill of a manufacturing corporation is properly constructed for the carrying on of its ordinary business, the corporation is not liable to an employé who has been injured by a fire, not caused by the negligence of the corporation, because it failed to provide means of escape from the fire; nor is such corporation liable for an accident resulting in injury to an employé from its failure to fence the ordinary machinery used in the servant's employment; if, however, there is a custom in reference to the adoption of certain safeguards in a given business, so general that the employer is presumed to have knowledge of it, he is guilty of negligence if he fails to adopt such safeguards.

A master is not chargeable with negligence when an employé is injured through the use of a machine for an improper or dangerous purpose, for which it was not intended or provided, but is guilty of negligence when he exposes an employé to dangers not obvious or fairly incident to the employment, or where he introduces new and unusual machinery, involving unexpected danger, without notice to his employé.

Employers are not, as a rule, required to furnish the best and latest improved machinery, but only such as is reasonably safe and suitable. Railroad companies, however, are ordinarily bound to adopt new inventions as soon as they have been proved by satisfactory tests to be safer than the appliances in use.

While it is the duty of an employer to exercise reasonable care in keeping buildings, machinery, tools, etc., in suitable and safe condition for use, and to this end he should frequently inspect the machinery, etc., used by his employés, the system of inspection need not be carried to such an extent as will embarrass the operation of his business.

A master who sets a servant at work in a place of danger without giving him such warning and instruction as the youthfulness, inexperience, or lack of capacity on the part of the servant reasonably requires, is guilty of negligence, and liable to the servant for an injury arising therefrom. The fact, however, that a master sets a minor servant to work at a more dangerous occupation than that in which he was originally employed, does not, in itself, render the master liable for an injury resulting therefrom, unless under all the circumstances the setting him at such work was a negligent act; but the master will be held more strictly accountable in such a case than in the case of an adult.

Proprietors of manufacturing establishments are charged with the duty of exercising ordinary care in providing their employés with suitable places in which they can work in reasonable safety, and without exposure to dangers not within the usual scope of their employment.

It is the duty of employers to make and promulgate such rules and regulations for the government of their employés as will, if observed, give them reasonable protection; and employés are bound to obey all the lawful and reasonable commands of their employers, though such commands may seem harsh and severe.

It is also the duty of employers to have a sufficient number of trustworthy, competent employés to properly and safely perform the labor required in the business in which they are engaged.

When certain duties are imposed upon an employer by legislative enactment or municipal ordinance, designed for the protection of his employés, it is negligence on his part to fail to comply with such requirements, and he is liable to his employés for injuries arising from such negligence, unless it can be clearly shown that they assumed the risk.

An employer cannot avoid his liability to an employé for injuries sustained by the latter through his negligence by means of a contract with such employé which provides that in consideration of the employment he shall be exempt from such liability. Such a contract is against public policy and void. The supreme court of the State of Georgia has, however, sustained the validity of contracts of this character.

Contributory Negligence by Employés. — It is a general rule that when an employé suffers an injury through the negligence of his employer he is not entitled to recover damages for such injury if his own negligence contributed thereto. Under this rule, where master and servant have equal knowledge of the danger of the service and the means of avoiding it, and the servant while engaged in the performance of his duties is injured by reason of his own inattention and negligence, the master is not liable; and where the servant is told to do a particular thing and is not directed as to the time or manner in which the work is to be done, it being left to his discretion, so that he is given some control over the means, times and manner of doing it, he is guilty of contributory negligence if he does not use the safest means, time and method of accomplishing the work and is injured while so engaged, and cannot recover damages from the master; nor can he recover such damages if injured by the use of a defective appliance under his own exclusive care; nor where he had knowledge of a defect in an appliance used by him, through which he is injured, and failed to notify the master thereof, if no blame was imputable to the latter in failing to discover such defect, or in failing to furnish a safe and suitable appliance.

But an employé's right to recover damages for an injury is not affected by his having contributed thereto unless he was at fault in so contributing, and he may recover, notwithstanding his contributory negligence, if the master, after becoming aware of the danger, failed to exercise ordinary care to prevent the injury or wilfully inflicted the damage.

When an employé in the course of his employment finds himself exposed to imminent peril, due to the master's negligence, and in the terror of the moment adopts a course exposing him to greater peril, and is injured, such action on his part does not constitute contributory negligence, and will not relieve the master from liability.

An employé is not guilty of contributory negligence if, when injured, he was exercising ordinary care to avoid injury, and discharging his duties in a careful and prudent manner, and the injury was sustained by reason of negligent failure on the part of the employer to exercise ordinary care for the employé's safety, as failure to warn the employé of extraneous risks and unusual dangers known to the employer but unknown to the employé, or to instruct an immature or inexperienced servant and warn him of the dangers attending his work not obvious to one of his capacity or experience; to provide suitable machinery, tools and appliances for carrying on the work at which the servant is employed; to inspect and repair machinery, tools and appliances; to provide a safe place for the servant to work, the ordinary risks of the business excepted; to guard against a danger to a servant of which the master has been notified, or which he has promised to obviate, or which he has assured the servant did not exist; to make and promulgate proper rules and regulations for the conduct of the employment in which the servant is engaged; to employ and retain a sufficient number of competent and trustworthy servants to properly and safely carry on the business. The employé does not assume the risk of injury by reason of the negligent failure of his employer in fulfilling any of the duties incumbent upon him, and, as before stated, is not guilty of contributory negligence when injured by such failure, if he himself was without fault in the discharge of his duty.

Contributory negligence is purely a matter of defence in actions by employés for damages resulting from injuries sustained during the course of their employment, and the burden of proving it is upon the master who seeks thereby to avoid liability for such damages.

Assumption of Risks by Employés. — Where an employment is accompanied with risks of which those who enter it have, or are presumed to have, notice, they can not, if they are injured by exposure to such risks, recover compensation for the injuries from their employer; by contracting to perform hazardous duties the employé assumes such risks as are incident to their discharge, and he assumes not only the risks existing at the beginning of his employment, but also such as arise during its course, if he had or was bound to have knowledge thereof. He does not, however, assume the risk of dangers arising from unsafe or defective methods, machinery, or other instrumentalities, unless he has, or may be presumed to have, knowledge or notice thereof, and the burden of proving that an injured employé had such knowledge or notice of the defect or obstruction causing the injury is upon the employer.

The employé assumes all risk of latent defects in appliances or machinery, unless the master was negligent in not discovering the same; but the experience, or lack of experience, of the employé is to be considered in determining whether or not he is chargeable with knowledge of such defects as are not obvious and of the danger arising therefrom.

Another risk assumed by employés is that of the master's method of conducting his business. If the employé enters upon the service with knowledge of the risk attending the method, he can not hold the master responsible for injuries arising from the use of such method, though a safer one might have been adopted; but in order to relieve the master from liability, the method must amount to a custom or mode of carrying on the business, and not consist merely of an instance or any number of instances of culpable negligence on the part of the master.

Negligence of Fellow-servants. — The general rule at common law is that he who engages in the employment of another for the performance of specified duties and services, for compensation, takes upon himself the natural and ordinary risks and perils incident to the performance of such services. The perils arising from the carelessness and negligence of those who are in the same employment are no exception to this rule, and where a master uses due diligence in the selection of competent, trusty servants and furnishes them with suitable means to perform the services in which he employs them, he is not answerable to one of them for an injury received in consequence of the carelessness or negligence of another, while both are engaged in the same service.

Various attempts have been made by judges and text writers to lay down some rule or formula by which to determine what servants of a common master may be said to be fellow-servants assuming the risk of each other's negligence. The following are well-known definitions:

Persons are fellow-servants where they are engaged in the same common pursuit under the same general control.

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All who serve the same master, work under the same control, derive authority and compensation from the same common source, and are engaged in the same general business, though it may be in different grades or departments of it, are fellow-servants who take the risk of each other's negligence.

The true test of fellow-service is community in that which is the test of service; which is subjection to control and direction by the same common master in the same common pursuit. If servants are employed and paid by the same master, and their duties are such as to bring them into such a relation that the negligence of the one in doing his work may injure the other in the performance of his, then they are engaged in the same common pursuit, and being subject to the same control, they are fellow-servants.

All servants in the employ of the same master, subject to the same general control, paid from a common fund, and engaged in promoting or accomplishing the same common object, are to be held fellow-servants in a common employment.

It is said that these definitions are faulty, and of little practical value by reason of their being stated so broadly and in such general and comprehensive terms, nevertheless they give a correct idea as to who have been determined by many courts to be fellow-servants within the rule exempting the master from liability for the negligence of one of them resulting injuriously to another.

The principal limitation contended for on the general rule in regard to fellow-servants is that there is such a servant as vice-principal, who takes the place of the master and is not a fellow-servant with those beneath him; and there is a variation of this idea to the effect that every superior servant is a vice-principal as to those beneath him. The doctrine of vice-principal is, however, repudiated by the courts of many of the States.

The master, as such, is required to perform certain duties which have been hereinbefore specified, and the person who discharges any of these duties, no matter what his rank or grade, no matter by what name he may be designated, cannot be a servant within the meaning of the general rule on fellow-servants. The liability of the master for the non-performance of such duties as the law implies from the contract of service, does not rest upon the ground of guarantee of their performance, but upon the fact of the presence or absence of negligence of the master in their performance.

Whether one is acting as the representative of the master or merely as the fellow-servant with others employed by the same master, does not depend upon his rank or title, but upon the character of the duties he is performing at the time another servant is injured through his negligence; if at such time the offending servant was in the performance of a duty which the master owed his servants, he was not a fellow-servant with the one injured, but a vice-principal, for the rule is fundamental that a master cannot rid himself of a duty he owes to his servants by delegating his authority to another and thus escape responsibility for negligence in the performance of such duty.

If, however, at the time of the injury the negligent servant was not engaged in the performance of duty due from the master to his servants, but was discharging a duty which was due from the servant to the master, he was a fellow-servant to the one injured, engaged in the same common business, and the master would not be liable for the injuries sustained by reason of his negligence.

It is held by the courts of some of the States that, as industrial enterprises have grown, and, because of the division of labor and the magnitude of operations, have been divided into distinct and separate departments, a laborer in one department is not a fellow-servant with a laborer in another and separate department of the same establishment.

Incompetency of Fellow-servants. — If an employer knowingly employs or retains an incompetent servant, he is liable for an injury to a fellow-servant sustained through the incompetency of the servant so employed or retained, provided the injured servant did not know and had not the means of knowing the incompetency of his fellow-servant. A master is not, however, liable for injuries to one servant by the negligence of another on the ground of unskilfulness of the latter, unless the injuries were caused by such unskilfulness.

A master does not warrant the competency of his servants, but must use all ordinary care and diligence in their selection and retention. If he has not been negligent in selecting a servant, and subsequently obtains knowledge of the servant's incompetence and still retains him, he is liable to another servant for any injury resulting from said incompetence. If the employer had no actual notice of the servant's incompetence, if it was notorious and of such a character that with proper care he would have known of it, he will still be liable.

If a person, knowing the hazards of his employment as it is conducted, voluntarily continues therein without any promise by the master to do any act to render the same less hazardous, the master will not be liable for an injury he may sustain therein, unless it is caused by the wilful act of the master. No servant is entitled to damages resulting from the incompetence of a fellow-servant when he knew of such incompetence and did not inform his employer of the same.

When it is alleged that the master has been guilty of selecting or retaining an incompetent servant, the burden of proof of said allegation is on the plaintiff. Neither incompetency nor unskilfulness will be presumed; they must be proved.

A master who has employed skilful and competent general agents or superintendents is liable for injuries received by inferior servants through the negligence of those employed by such general agents or superintendents without due care or inquiry, or retained by them after knowledge of their incompetence.

While the servant assumes the ordinary risks, and, as a general rule, such extraordinary risks of his employment as he knowingly and voluntarily encounters, he is not required to exercise the same degree of care as the master in investigating the risks to which he may be exposed; he has the right to assume that the appliances and machinery furnished him by the master are safe and suitable for the employment in which he is engaged; and to assume, when engaged in an occupation attended with danger and requiring engrossing duties, that the master will not, without proper warning, subject him to other dangers unknown to him, and from which his occupation necessarily distracts his attention; and he has the right to rely upon the taking by the master of all usual and proper precautions against accident, and his faithful fulfilment of all the duties devolving upon him.

If an employé is ordered by his master into a situation of danger and obeys, he does not assume the risk unless the danger was so obvious that no prudent man would have obeyed the order; and the master will be liable for any injury resulting to him by reason of such dangerous employment. If, however, he leaves his own place of work for one more dangerous, in violation of the master's direction, he can not recover for an injury sustained after such change.

If the servant, upon being ordered to perform duties more dangerous than those embraced in his original employment, undertakes the same with knowledge of their dangerous character, unwillingly and from fear of losing his employment, he cannot, if injured, recover damages from the master; nor can he recover such damages where the injury results from an unexpected cause during the course of his employment; nor where the injury is sustained in the performance of a service not within the scope of his duty, if his opportunity for observing the danger is equal to that of his employer; and where an employé voluntarily assumes a risk he thereby waives the provisions of a statute made for his protection.



THE COMPETITION FOR THE ART BUILDING AT FAIRMOUNT PARK.

THE sixty-seven designs sent in a month ago in competition for the proposed new Museum to be erected by the City of Philadelphia in the original Fairmount Park, on the east side of the Schuylkill, were submitted to the judgment of a jury, consisting of Messrs. D. H. Burnham, as Chairman, Mr. Stanford White and Professor Ware, of New York, and Messrs. J. M. Wilson and Johnson, of Philadelphia, who were asked to report the best eight to the Commissioners. They spent two days in making this selection, and a week or two in studying photographs of these eight designs with a view to a final report. This they presented to the Commission on Tuesday, recommending that the four prizes of $6,000, $3,000, $2,000 and $1,000 should be given to the designs marked "Keystone," "Acropolis," "Black Seal" and "Nike." The other four selected were marked "Proportion," "Maltese Cross," "Quantum Valeat" and "Φ." The Commission, after listening to the report and to the verbal explanations that were made in answer to questions, at once voted the premiums in accordance with their recommendation. On opening the envelopes it appeared that "Keystone" was the work of Messrs. James Brite and Henry Bacon, of New York, "Acropolis," of Messrs. Lord, Hewlett and Hull, of New York, "Black Seal," of M. De Montclos, of Paris, and "Nike," of Messrs. Howard & Cauldwell, of New York.

M. de Montclos's design consisted of an open semicircular corridor, or arcade, from which radiated the twelve picture galleries called for by the programme, six on each side of a central hall, beyond which was a vast circular hall covered with a dome. The other three designs all had for their principal feature three lofty halls *en suite*, lighted from the roof, and enclosed first by a corridor and then by galleries, in two stories, for sculpture below and for paintings above. In "Nike" and "Keystone" the central compartment was covered with a dome. In the schemes of "Acropolis" and "Nike" three courts were shown at the side of these, two open above, the central one covered, and in that of "Acropolis," covered with a dome. "Nike" and "Acropolis" showed more or less extensive galleries or corridors branching out into the Park. "Keystone," which was the largest of all, measuring about 300′ x 600′, was also the simplest, showing no accessories whatever.

The Commission made the great mistake of asking for drawings at the scale of eight feet to the inch. Thirty-two feet to the inch would have done just as well and have saved the competitors hundreds of dollars of unnecessary expense, and the jury and the

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Commission themselves a vast amount of trouble in handling the drawings, many of which were eight and ten feet by nine.

The photographs over which the jury did the major part of their work showed the designs at a scale of sixty-four or even one hundred and twenty feet to the inch. Yet even these were large enough for almost every purpose.

It was a troublesome mistake, too, to forbid perspective sketches. It was noticed that a chief part of the time occupied at the conference on Tuesday was taken up by the jury in trying to explain to the Commission how the designs would look in perspective. It appeared, indeed, that the jury had had to make perspective sketches for themselves in order to understand what the designs really meant.

But the Commission more than made up for these errors, and deserve the lasting gratitude of the profession for their action at least, not only in submitting the selection of the plans to a competent tribunal — an example specially valuable in the case of municipal buildings — but in promptly accepting the judgment of their advisers, without giving time for even a suspicion of political or personal interest.

SOCIETIES

CLEVELAND ARCHITECTURAL CLUB.

THE Annual Banquet and Meeting of the Club was held at the Hollenden Hotel, Thursday evening, November 14, with about forty present. Dinner was served at 6 o'clock, followed by toasts from Messrs. John L. Culley, F. A. Coburn and Chas. W. Hopkinson with Pres. Hubbell as toastmaster.

After the speaking the annual meeting was held, with an address by the President, reports of the Secretary, Treasurer, Librarian, Chairman of the Current Work Committee and the Chairman of the Entertainment and House Committee.

The Club has grown from a charter membership one year ago of fourteen to a total membership of forty-five.

The newly elected officers are: *President*, Benj. S. Hubbell; *Vice-President*, Frederick Baird; *Secretary*, Herbert B. Briggs; *Treasurer*, Albert E. Skeel; *Librarian*, G. B. Bohm, M. James Bowman and C. S. Schneider.

HERBERT B. BRIGGS, *Secretary.*

THE T-SQUARE CLUB, PHILADELPHIA, PA.

"THE Main Entrance to a Private Estate" was the subject of competition at the November meeting of the T-Square Club, held on the 20th. Twelve drawings were entered in the competition, four of which were disqualified for non-compliance with the conditions of the programme. The disqualifying of these drawings was a very unpleasant duty for the Club members, as their design and draughtsmanship indicated an earnest effort on the part of the competitors.

The mentions were awarded to Lloyd Titus, First; Adin B. Lacey, Second; A. L. Storm, Third.

The other competitors were Molitor, Valentine, Calvert, Bassett, Trout, Kelsey and two unknown.

The next lecture in December will be delivered by Mr. William Price, on "Domestic Architecture." He will talk about the social conditions of the various epochs and will demonstrate how in the past, in the present and in the future these have left and must leave their impress upon the dwellings of the masses. He will lay special stress on the fatal results of adoption as opposed to legitimate adaptation, and in concluding his remarks will invite a general discussion.

ADIN B. LACEY, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSES OF WILLIAM MCMILLAN, ESQ. AND W. H. THORNBURGH, ESQ., PORTLAND PLACE, ST. LOUIS, MO. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.

[Gelatine Print issued with the International and Imperial Editions only.]

A DESIGN FOR THE MINNESOTA STATE CAPITOL, SUBMITTED IN THE SECOND COMPETITION. MR. GEORGE R. MANN, ARCHITECT, ST. LOUIS, MO.

To this design was awarded the second prize in the recent competition.

SECTIONS OF THE SAME.

PLANS OF THE SAME.

[Additional Illustrations in the International Edition.]

GATEWAY TO WASHINGTON TERRACE, ST. LOUIS, MO. MR. GEORGE R. MANN, ARCHITECT, ST. LOUIS, MO.

[Gelatine Print.]

DETAIL OF THE UNION TRUST BUILDING, OLIVE ST., ST. LOUIS, MO. MESSRS. ADLER & SULLIVAN, CHICAGO, ILL., AND C. K. RAMSEY, ST. LOUIS, MO., ASSOCIATED ARCHITECTS.

[Gelatine Print.]

PALAZZO BIZARRO, RAGUSA, DALMATIA.

THIS plate is copied from the *Zeitschrift für Bauwesen.*

ROYAL INSURANCE CO.'S BUILDING, BUCHANAN ST., GLASGOW, SCOTLAND. MESSRS. HONEYMAN & KEPPIE, ARCHITECTS.

THIS plate is copied from the *British Architect.*

RAILROAD STATION, BUCHAREST, ROUMANIA.

THIS plate is copied from *Architektonische Rundschau.*

NEW CONCERT-HALL, ZURICH, SWITZERLAND. MESSRS. FELLNER & HELMER, ARCHITECTS, VIENNA, AUSTRIA.

THIS building, lately opened, contains several large assembly-rooms, concert-halls, with dining-rooms, refreshment-rooms, and suites of rooms which can be let out for private entertainment. The main hall will seat 1,500 for concerts, with an orchestra of 80 and a chorus of 350. The second hall holds 1,000 and the third about 600. The acoustic properties of the halls are considered very satisfactory.

This plate is copied from the *Schweizerische Bauzeitung.*

HOUSE OF THE LATE WILLIAM BURGES, ARCHITECT, KENSINGTON, LONDON, ENG.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

CORRECTIONS.

NEW YORK, November 30, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The profession in our little town of Gotham ought doubtless to feel proud that somebody in your office or composing-room has such abounding notions of its architectural practice, compared with that of the other centres of art and culture, as to imagine that, even during the space of quarter of a century, nearly a million assistants, draughtsmen and students have emigrated from inappreciative Boston and elsewhere to sue, through our Chapter entry-book, for positions with those of the contingent who have hung out their shingles in New York streets. For so your multitudes of subscribers will read in your issue of to-day, on page 103, under the heading of "New York Chapter A. I. A."

But truth is more modest than fancy. I find, by a carbon duplicate of the type-written copy sent you, that the statement it contains corresponds with the entries in said book — viz, not that there have been, as you lavishly proclaim, nearly a million, but less than a thous — to be exact, just nine hundred and thirty-five (935) such applicants — and; at that, not many of these, even when from Boston, immediately successful in their search. New York can stand a good deal, but pray don't unload the whole of Boston on us.

Your brief sketch of the professional life of one of our architectural worthies, who has just joined the majority, gives a false impression as to the Brooklyn Park. Mr. Frederick Law Olmsted was equally associated with Mr. Vaux in carrying out that Park, but Mr. Vaux himself designed its main features, substantially as they now exist, before Mr. Olmsted's connection with it. Mr. Withers was associated with Mr. Vaux, in his architectural practice, long before the formal disconnection of Olmsted and Vaux in landscape design.

Yours truly, A. J. BLOOR.

[THE "copy" from which our compositor worked exonerates him and the proof-reader from the charge of inexcusable stupidity. — EDS. AMERICAN ARCHITECT.]

DANGEROUS BOILERS.

BOSTON, MASS., November 21, 1895.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — During the past few months many lives and much property have been destroyed by the explosion of fire-tube steam-boilers, thirty-one being bodies removed from the ruins of one school-house that was destroyed by fire, and at another school-house several

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children narrowly escaping with their lives during the burning of the building.

It is my opinion that school-houses and all other public buildings should be made according to the best Boston Building Law for a first-class building; that all dangerous steam-boilers be removed from under school-houses and other public buildings, and no more dangerous heating-apparatus be placed under public buildings; that all public buildings be built and improved, to be according to the best modes of heating and ventilation, and sanitation, now in use.

It is very near murder, on the part of officials, to endanger the lives of human beings, as has been done to save a few days' work, or, as they speak, "save a few dollars," from being circulated among the people. Yours respectfully, Aurin F. Hill.

EXHIBITIONS

Atlanta, Ga. — *Cotton States and International Exposition:* September 18 to December 31.

Boston, Mass. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St.

Water-colors by Louis K. Harlow: at Williams and Everett's Gallery, 190 Boylston St., until December 9.

Pastels by J. Appleton Brown: at Doll & Richards's Gallery, 2 Park St., until December 11.

Paintings by Wilton Lockwood: at the St. Botolph Club, December 2 to 14.

Ninth Exhibition of Water Color Club: at J. Eastman Chase's Gallery, December 6 to 18.

Chicago, Ill. — *Eighth Annual Exhibition of Oil-paintings and Sculpture:* at the Art Institute, October 22 to December 8.

Paintings by Glasgow and Danish Artists: November 19 to December 22.

Paintings by the Chicago Palette Club and Chicago Art Students League: December 12 to 29.

New York, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South, opened November 28.

Drawings by George du Maurier: at Wunderlich & Co.'s Gallery, 868 Broadway, November 23 to December 21.

Pictures by Walter L. Palmer: at the Avery Galleries, 368 Fifth Ave., December 2 to 14.

Philadelphia, Pa. — *Autumn Exhibition of the Philadelphia Art Club:* opened November 18.

Springfield, Mass. — *First Annual Exhibition of Society of Springfield Artists:* at Rude's Gallery, December 4 to 25.

NOTES AND CLIPPINGS

The Colloseum. — It seems strange that not until the middle of last century did it occur to any of the successors of Peter to rescue from the desecration of indifference a spot saturated, one may say without hyperbole, with the blood of the martyrs. Everybody knows that earthquake, fire and inundation competed with each other for its destruction. Guiscard's troopers stalled themselves there, and the Frangipani transformed it into a fortress. When less turbulent times supervened it became by tacit consent the common quarry of the more powerful Roman houses. When for a time friendly enough with each other, they held tilt and tourney within it, and then Mystery plays restored for a time its theatrical character. Sixtus V had a scheme for turning it into a woolen manufactory, and another Prince of Peace thought it would serve capitally as a powder magazine. Meanwhile it remained a convenient market-place for the sale of vegetables. But in 1750 an earnest Ligurian monk, Leonardo da Porto Maurizio, came to Rome, craved audience of Benedict XIV, and, obtaining Papal sanction for the new form of devotion known as the Via Crucis, induced the Sovereign Pontiff to consecrate the Colloseum, to celebrate mass there, and to erect a large wooden cross in the very centre of the pagan arena. Ever since the Stations of the Cross, commemorating the journey to Cavalry, have encircled the vast ellipse, and the newcomers, whose rising voices disturbed my reverie, are wandering hither behind a tall, barefooted, bareheaded Franciscan friar, to make the dolorous pilgrimage. All the fine ladies of Rome are there and, heedless of delicate flounce and furbelow, they kneel on the unswept ground at every halt made by the rosary-girdled monk, and bow their heads in audible lamentation. Then, when the long, sad service is completed, he rebukes them for their transgressions and invites them to a holier life. That much I can make out from where I sit, in sympathetic contemplation of the scene, though no small part of his exhortation reaches me but in fitful vowel sounds, musical, but somewhat vague in meaning. Before they have come to a close a blare of trumpets tells me that a body of French zouaves is coming along the Via San Gregorio, between the Palatine and Cælian Hills, on their way back to barracks from the exercising ground that lies beyond the tomb of Caius Cestus and Shelley's burial place.

> The insolence of alien drum,
> Vexing the bright blue air,
> To smite a people's anguish dumb,
> Or speed a rash despair,
> That once had wrung
> That prophet tongue
> To challenge force and cheer the slave,
> Rolls unrebuked around his grave.
> . . . . . .
>
> — *Fortnightly Review.*

Gum Flooring. — There never was a time in which a hard, smooth, durable flooring was so much in demand as in recent years. A competition has sprung up between the different hardwoods adapted to flooring. Yellow pine, though not deemed in the category of hardwoods, is sufficiently hard to make substantial flooring, and when quarter-sawed cannot be beaten for durability. Rock or sugar maple has come to the front as an admirable flooring material, and for smoothness and solidity is thought by many to exceed anything in use. Oak is largely used for fine floors, especially those which are to be covered with rugs instead of carpets. Pacific coast fir is to become an important competitor of the other woods in the flooring line. There is another wood that is making little stir, and is not obtrusive, neither are its praises much sounded abroad. We mention gum with confidence, but fully aware that some will sneer at the name. Yet gum flooring is making headway, and a larger quantity of it is being manufactured and going into use than many are aware. Gum, or hazel as it is called in some portions of Missouri and Arkansas, is a wood eminently adapted to a smooth, solid and durable flooring. The genuine red gum of the lower Mississippi bottoms runs well to heart wood, and is less liable to warp than the white gum which abounds farther north. When sawed into narrow strips, rightly piled and dried, it is handled without much trouble from warping. George Prentiss told how it could be done in the last issue of the *Lumberman*. There is apparently no reason in the world why gum should not be extensively utilized for flooring. It presents a rich color-tone, and is susceptible of high polish, if that is desired. It can be used plain or quarter-sawed. Mr. Prentiss prefers the plain sawed strips for flooring. The whole log can be converted into flooring, as it runs largely clear of knots or other defects. When plain-sawed, both heart and sap can be used for flooring. In price it can compete with any wood extant. — *Northwestern Lumberman.*

The Foreign Population of Paris. — It is stated on the authority of *Le Siècle*, that there is no chief city in Europe which contains such a large proportion of foreigners as Paris. In London there are 95,000 foreigners; in St. Petersburg there are 23,000, or 24 to every 1,000 inhabitants; in Vienna 35,000, or 22 per 1,000; in Berlin, 18,000 or 11 per 1,000. These proportions are small in comparison with Paris, where there are 181,000 foreigners, or 75 per 1,000, to which number must be added 47,000 naturalized French subjects. In Paris there are 26,863 Germans, and in Berlin there are only 397 French people. The nationalities chiefly represented in Paris — after the German — are Belgians (45,000), Swiss (26,000), and Italian 21,000; English (13,000), and Russian 9,000. The number of aliens is rapidly increasing in Paris. In 1883 the number was estimated at 47,000; in 1851 this number had increased to 53,000; in 1876 it amounted to 119,000, and in 1891 to 181,000. Of these foreigners 8,000 only are persons of independent means; 20,000 are in business on their own account, or heads of commercial houses; 16,000 are employés; 57,500 workpeople; 17,000 domestics, and 62,000 are composed of women or children engaged in no business or profession. As a general rule, foreign competition is less keen in the occupations engaged in by women than in those by men, always excepting the occupations of domestic servants and governesses.

A Canard with Wings. — A Yankee farmer in Brazil who longed for the cooling liquids of his native land, and was unable to obtain them in that tropical country, has utilized a kite for the purpose of obtaining ice. The enterprising grandson of Britannia fills a tin can with water and sends it to the height of three miles, where it is promptly frozen. After a sufficient interval, the kite is rapidly hauled in and the cake of ice secured. The inventor is so pleased with his toy that he now proposes to send up a kite 150 feet long by a steel wire cable. Under the kite will be suspended a pulley, over which runs an endless chain bearing cans attached to hooks. The cans will be filled with water, and the speed of the belt upon which they run will be regulated so that the topmost cans will be converted into ice sufficiently hard to stand the downward journey. This is certainly the most original ice machine of which we have ever heard. We have the authority of the *South American Journal* for this kite flying.

Wolsey's Gold Knocker. — James Payne says that at Ottford, in Kent, there was formerly a palace of the archbishops of Canterbury, in which Wolsey is said to have held his court. "It was but a small place and is now a farmhouse, picturesque enough, but exhibiting no special signs of prosperity. The other day, however, this little incident happened: The farmer sent for a carpenter to do some odd jobs about the house, and among other things to mend the knocker. The man took it off and said, after a close examination of it: 'Do you know what this knocker is made of?' 'Why, brass, I suppose.' 'No; it is pure gold.' And it was. Think of the years that that rich prize has hung at the mercy of every tramp!" — *Boston Transcript.*

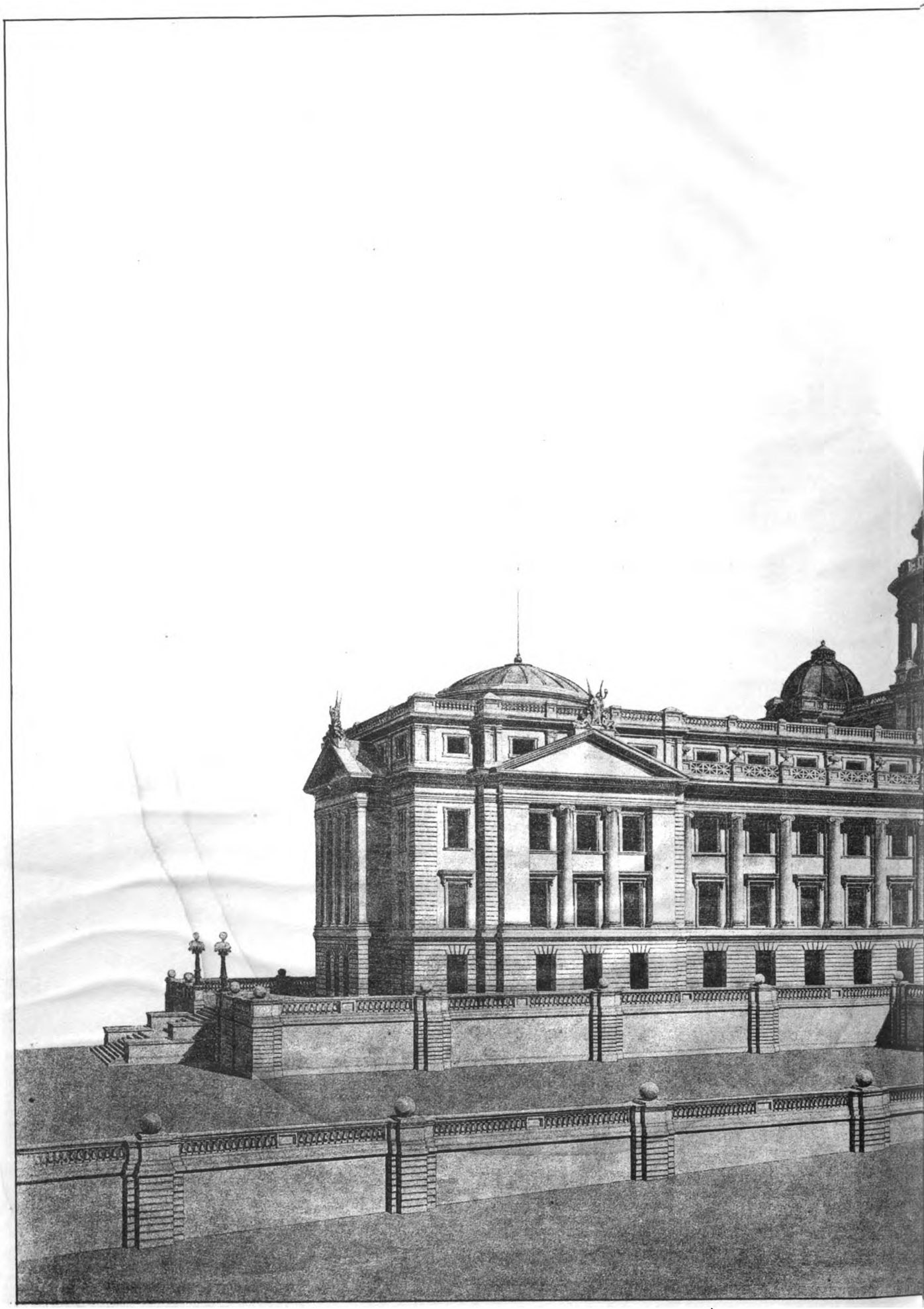
More German Thoroughness! — A portion of the newly constructed Schwanthaler Passage, Munich, collapsed November 5, with a dreadful crash, burying fifteen workmen under the ruins. Five were taken out dead and six dying, and the others were still under the *débris*. — *Exchange.*

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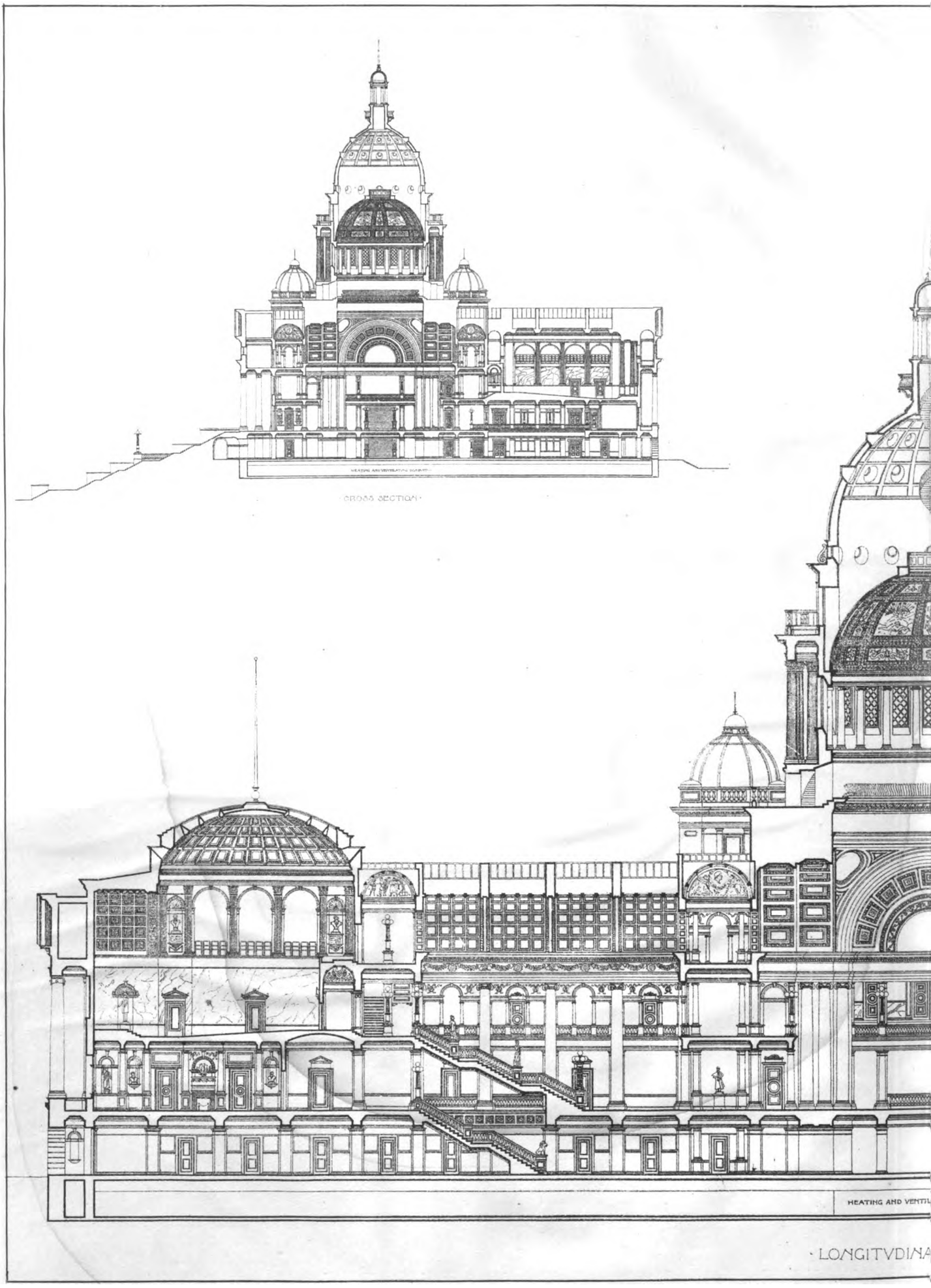
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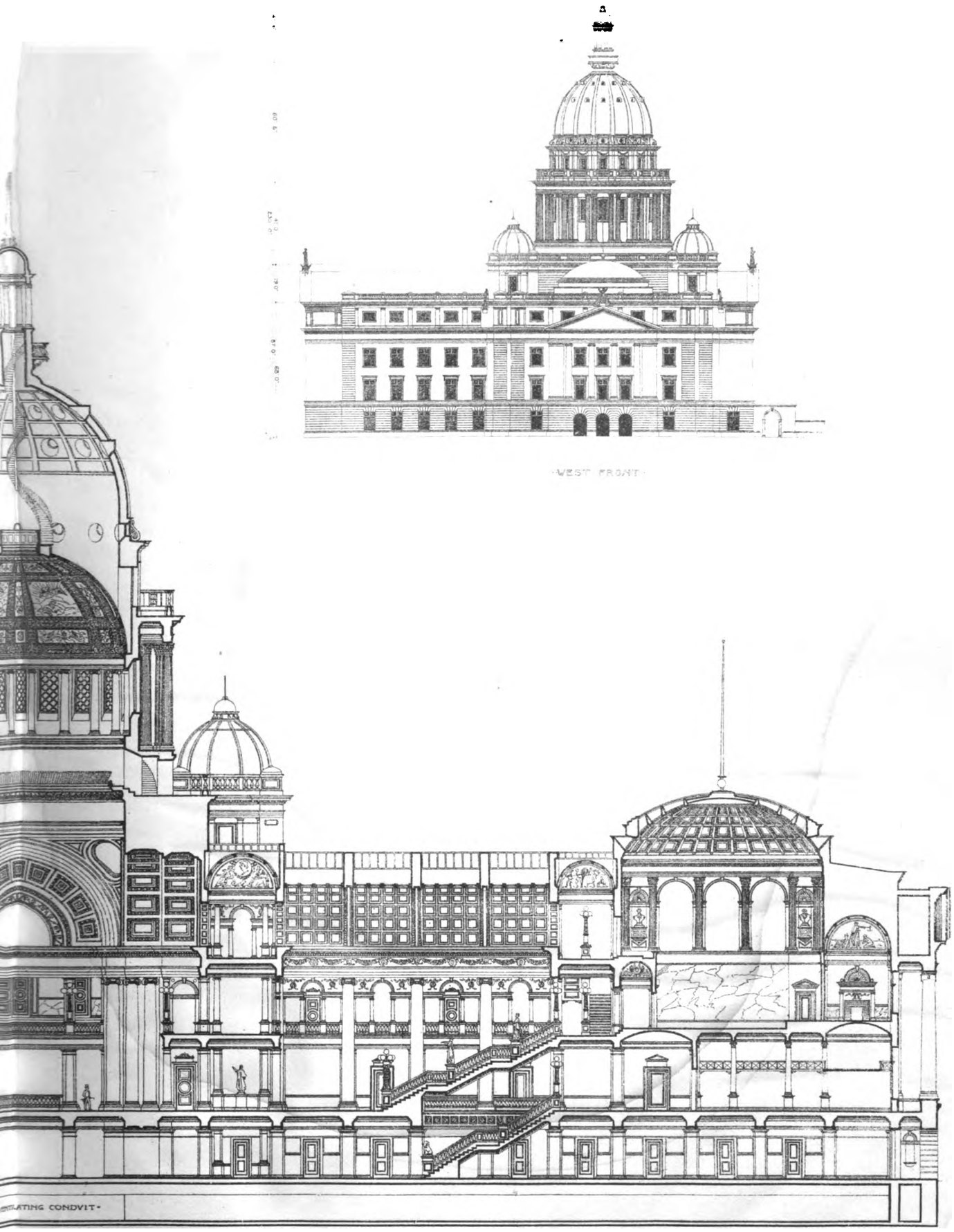


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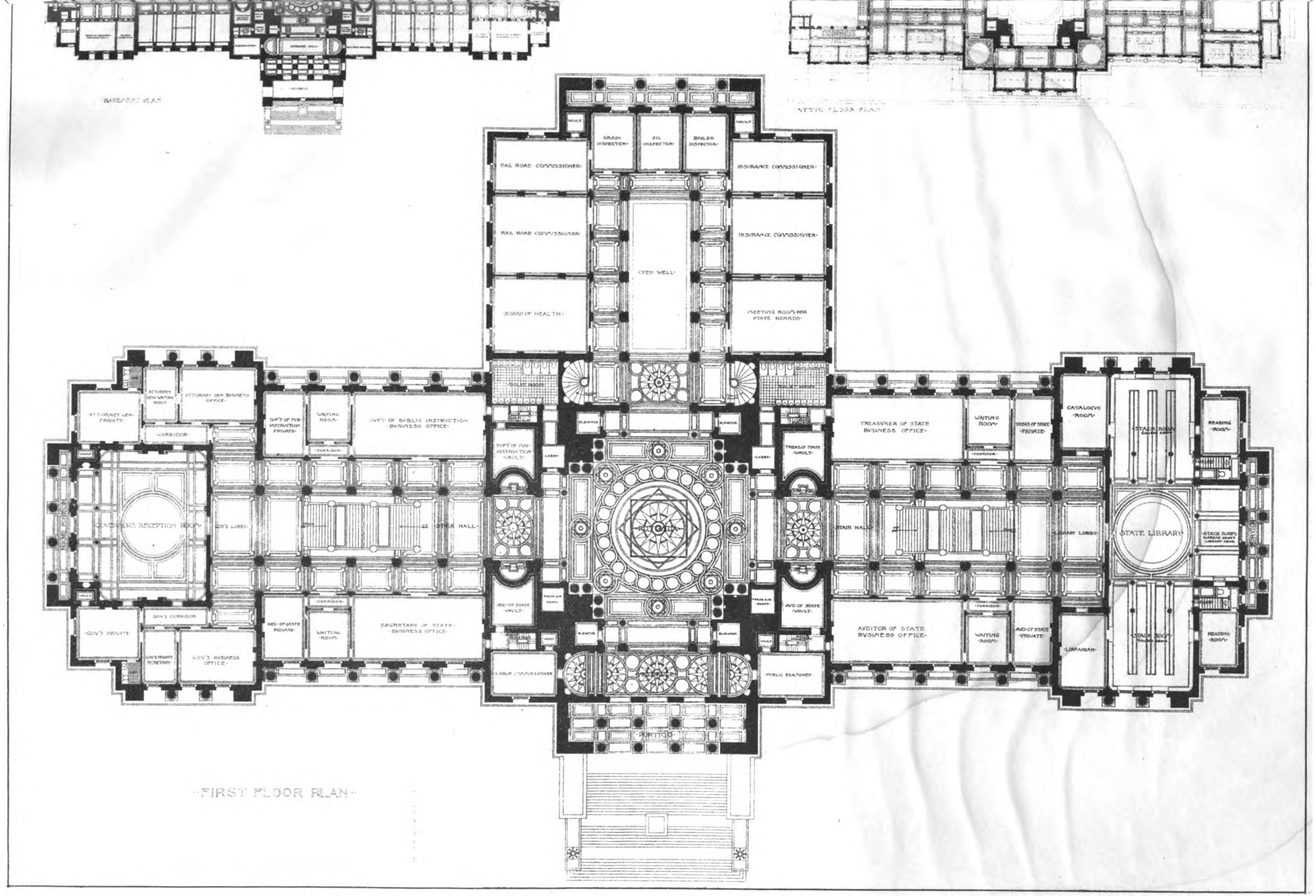
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FIRST FLOOR PLAN

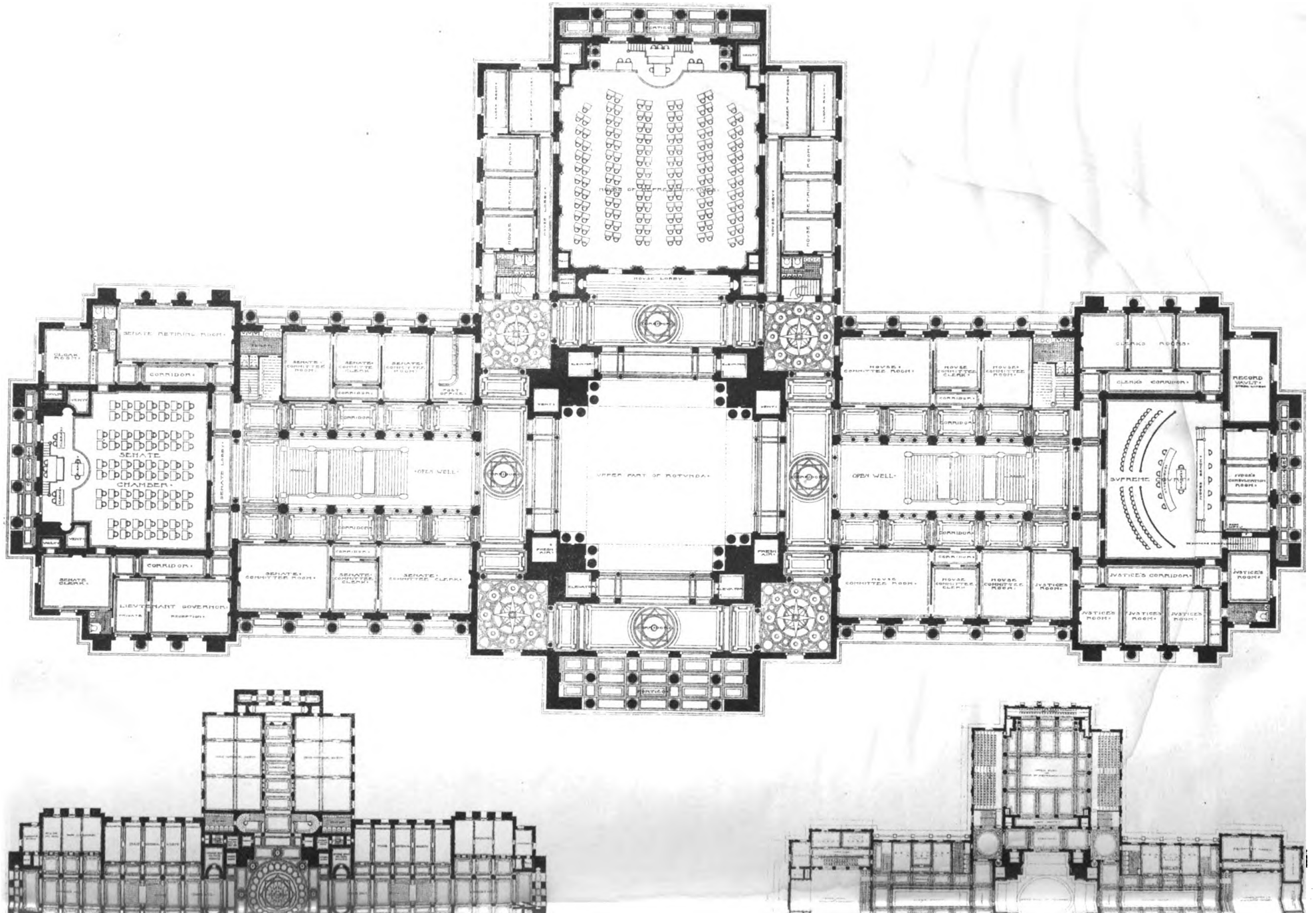
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THE old, old notions about the incapacity of architects for producing artistic and beautiful buildings, and the importance of returning to the alleged ancient practice of committing architecture to the tender mercies of masons and carpenters, have reappeared in England, this time under the patronage of no less a person than Mr. Lethaby, the author, in conjunction with the late Mr. Swainson, of the excellent little book on St. Sophia at Constantinople, which, as we hope, our readers are familiar with. Mr. Lethaby, who is undoubtedly earnest in his endeavors to promote a better conception of the part of architects in building, and whose book contains a great deal on this subject that architects will approve, in his later disquisitions, which have been delivered recently in London in the form of lectures, is so unfortunate as to quote Daudet, Professor Mahaffy, William Morris and Ruskin, in support of his theories; and thereby undoubtedly injures his own cause; for not only architects, but people of sense generally, pay about as much attention to the views of these gentlemen on matters of architecture as they would to those of a wolf on the proper deportment of lambs. Mr. Lethaby thinks that the art of architecture has reached a point where it needs to be refreshed by a return to the study of natural forms and principles; and all architects will, to a certain extent, agree with him; but they will agree with him only because they feel in themselves the æsthetic want that the infinite beauty of nature can supply, and not because of arguments based upon the fancies of people perfectly ignorant of the subject.

MR. LETHABY is also unfortunate in fortifying his theories by reference to the assumed custom of the ancients, and of the mediævals, of having their buildings designed by the workmen as they went along. The notion that the people of the Middle Ages, or of antiquity, did anything of the kind has been so thoroughly exploded that it is surprising that an intelligent architect like Mr. Lethaby should have brought it up again. In his own book he glorifies Anthemius as the architect of St. Sophia, agreeing in this with the contemporary historians of the period, who, while ascribing the merit of the design to the Emperor Justinian, whose desire for fame as an artist they well knew, praise the judicious selection by which he chose the noted architect of Tralles to carry out his conception. Mr. Lethaby would probably not undertake to persuade us that Justinian had to send to a little town in Asia for some one to teach the workmen of Byzantium how to set stone; and if it was to design the profile of the domes, and arrange the openings, to balance the thrusts against each other, and provide proper resistance in the buttresses, that he needed Anthemius, in what way did the latter's work differ from that of the modern architect? The refuge of the sentimentalists who try to disparage modern architecture, by describing an imaginary state of things which they assert to have existed in the great artistic epochs, when asked who it was, if not an architect, who solved the problems of plan, construction and design presented by the great buildings of all ages, is generally to escape the difficulty by saying that, at least, this person was not paid much, if any, more than a common workman. How a man is less an architect and an artist because he is poorly paid is a question which the sentimentalists can perhaps solve; but the historical fact is that the people who did architectural work in ancient times were highly paid; more highly, apparently, than architects in modern times. Our readers will remember the curious story of the two architects in Rome, who were so rich that they offered to build a temple at their own expense, hoping to be allowed to perpetuate their memory by inscribing their names on it; and an admirable notice in the *Builder* of Mr. Lethaby's lectures quotes a passage from a Greek author of the second century B. C. in which it is said that "As to building . . . an ordinary builder (τεκτων) may be secured for five or six minæ, (about ninety dollars), but an architect (αρχιτεκτων) cannot be had for less than ten thousand drachmæ," (about seventeen hundred and fifty dollars). It would be difficult to find, in all Greek literature, a sentence more closely resembling one that might pass between friends at the present day, discussing building matters, except that the financial position of the architect then, as compared with that of the builder, or, as the word might, perhaps, be better translated, the building mechanic, was many times more comfortable then than it is now. The Greek quotation goes on, "But there are few such architects among all the Greeks," a condition of things which, again, agrees closely with that now existing. Remarking, also, that Vitruvius was a Roman noble, who seems to have adopted the profession of architecture, in defiance of the traditional Roman contempt for all artistic pursuits, out of pure love of art, and was able to sustain his rank by the income that he derived from it, we find, in the Middle Ages, abundant evidence that architects were employed then just as they are now. The architects of several of the great French cathedrals are buried within their walls, just as Wren was buried in St. Paul's, and for the same reason — to do honor to the artistic creator of the structure; and the contract between a French architect and the ecclesiastical authorities of a city in Spain show that the services of men of distinction were sought by strangers, and well paid for, just as they are now; while the archives of the Cathedral of Tournai give ample details of the employment and duties of the successive architects to that fabric. In fact, so far as the documents show, architects now have to work harder, and incur greater anxiety and responsibility, than ever before in the history of the profession, and for less pay; and the idea that they are altogether superfluous, and that the designing of buildings ought to be left to bricklayers and stone-cutters, is entirely modern. No doubt, Mr. Lethaby thinks that architects could carry out their designs better if they could spend more time at their buildings; and so does every other architect; but it is of little use to study a design on the ground without the liberty of modifying it; and it is really in this point that the moderns are most at a disadvantage. While Anthemius, or Ictinus, or Pierre de Montereau, could have a detail changed if they thought its effect in execution would be improved, and their clients would pay the difference in cost, and be grateful to them for their zeal, the modern architect is tied to the contract with the builder as strictly as the builder himself. Any change which may suggest itself to him, as the work advances, as desirable, is met by a storm of extra charges and demands from the builder, and austere looks from his clients, who always wind up by informing him that, as he did not foresee at the beginning just what the effect of the executed work would be, he must pay out of his own pocket the cost of changing the design; and the consequence is that, not caring to devote his tiny fee to beautifying his employers' buildings, he, after he has had some experience in such affairs, keeps his artistic criticisms to himself.

A CORRESPONDENT sends us a copy of an "invitation to architects" to submit competitive designs for certain school-houses, on the familiar terms so dear to the hearts of the "keen business-men," and "close buyers," who direct

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most of our public architecture. Two school-buildings are to be erected, and two sets of plans and specifications may perhaps be accepted, unless the Trustees should prefer to reject them all. Each set of plans is to contain four elevations and two "cross-sections," "all prepared as working drawings." Nothing is said about horizontal sections, but it is presumably expected that an assortment of these will be included in the collection. Certain details of construction must be rigidly adhered to, such, for example, as that the "footings of walls shall be below basement floors"; "roof-gutters, valleys and any and all decks shall be made of sheet copper," and no interior brick wall shall be less than nine inches thick. If the Trustees should accept two sets of plans and specifications, they are to become their absolute property, but the authors of the plans are without charge to furnish complete sets of specifications and working plans, with copies in triplicate of the same, all such copies, as well as the originals, to become the absolute property of the Trustees. "As soon as all the conditions are complied with," the Trustees will pay to the "successful" architect the sum of five hundred dollars in full of all fees and demands of every kind. It is distinctly understood that the preparation of the plans that may have been adopted "does not carry with it the right of supervising the erection of the buildings." On the contrary, "The Board further reserves the right to employ any person at discretion to superintend the erection of said buildings, but hereby agrees to let the contracts for supervision of the same upon fair and open competition."

TO put it briefly, the Board expects architects to scramble for the chance of preparing plans, details and specifications for a thirty-thousand-dollar building, with copies in triplicate of each piece, for a compensation which would not much more than cover the bill for blue-printing and typewriter work; yet, so alluring does it seem to consider the bait which it holds out to the profession that it is expressly stipulated that no architect shall be allowed to submit plans at all unless he first gives bonds, in the sum of two thousand dollars, that the cost of the building executed from his design will not exceed his estimate. Considering that the execution of the plans would, in all probability, be put under the supervision of a disappointed rival, who would bid low for the job for the sake of the opportunity which it would afford him for "getting even" with his successful opponent, there is something grotesque in the idea of putting the authors of the plans under bonds as to the cost of execution. It is hard to believe that the Trustees will receive any plans under these stipulations. Most invitations of the sort are responded to by thieves, who, by collusion with the contractors, put secretly at least ten dollars in their own pockets for every dollar of difference between the compensation offered them and that which an honest architect would charge; but in this case, where the supervision is likely to be entrusted to a rival, the quiet filling of the "architect's" and contractor's pockets from the public treasury is not so easy. The ordinary method of defrauding the public in building operations is for the alleged architect to draw specifications and contracts requiring work of most elaborate excellence; and, when the time for execution arrives, to certify, as satisfactory, work of a very different character. As the specifications and contracts are not usually matters of public record, no outsider has the means of detecting the fraud, even if he had the necessary leisure and technical knowledge requisite for doing so; and, after the community has paid for the work described in the specifications, and the contractor has paid for that actually put in and accepted, there remains a very handsome balance, amounting, in some actual cases, to about half the contract price of the building, for division among the ingenious gentlemen by whose collaboration it has been saved; and it is evident that, the greater the number of people who have to share the fund, the harder they must work to make it large enough to supply them all with a satisfactory dividend. It is understood that we do not mean to suggest the possibility of any such transactions in connection with these particular school-houses. On the contrary, we are convinced that all the citizens of the community which is to pay for them and enjoy them love to work for nothing, and carry out with perfect fidelity every kind of trust, at their own expense; but it will do no harm for the people of the less immaculate outer world to remember that it is notorious in the building professions that the comparative cost of public buildings varies about in inverse ratio with the compensation paid the architect; that is, that an architect who accepts one-half the usual fees for his services generally produces a building which costs much more than the same building would cost in the hands of his more scrupulous, and consequently more expensive brother.

WILLIAM H. RINEHART, a noted Baltimore sculptor of the last generation, left a considerable fund for the encouragement of young sculptors. The money was originally left to the late William T. Walters, as trustee, but, after his death, was turned over to the Peabody Institute. The income is now more than five thousand dollars a year, and the Trustees of the Institute have for the first time put it to its intended use, by awarding two travelling-scholarships, one for study in Rome, and the other for study in Paris. The former was awarded to Mr. Herman Atkins McNeil, of Chicago, and the latter to Mr. A. F. Proctor, of New York. Mr. McNeil has already studied in Paris, under Falguière and Chapu, and has a considerable reputation as a sculptor, although he is only twenty-eight years old. Mr. Proctor is a younger man, who has devoted himself particularly to the study of Indians. The scholarships are annual, but the holder of either may compete again until he has held one for four years; and each holder of a scholarship must send annually to the Trustees of the fund a bas-relief, a statuette and a bust, of his own work.

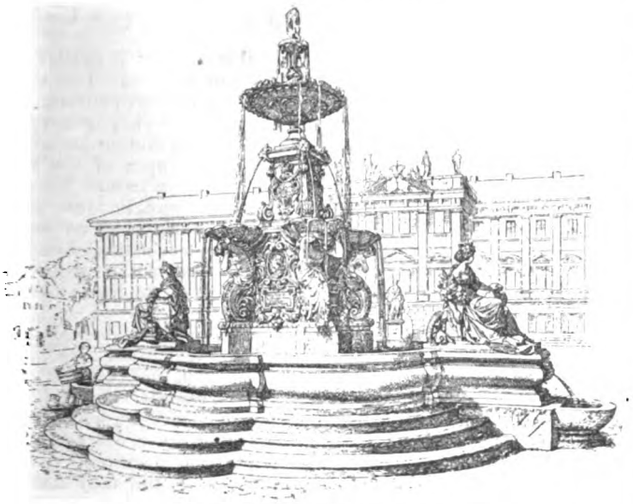
THE lovers of Alpine travel will be more or less delighted to hear that a project has really been formed for a railway up the Mont Blanc. M. Issartier, a mining engineer, after long study of the problem, has produced a plan for the construction of the road which is really startling in its simplicity. It is hardly necessary to say that the topography of the Mont Blanc, to say nothing of the eternal snow with which it is covered, does not lend itself easily to the construction of a surface road; and M. Issartier accordingly builds his railroad entirely beneath the surface, where he can shape its profiles to suit himself. Moreover, having once determined to keep underground, it is evident that the distance below the surface is not of much importance; so the engineer, instead of endeavoring, like his predecessors, to keep his tunnels somewhere near the outside of the mountain, in order to provide for occasional glimpses of the exterior world, solves the problem of the selection of a route by running his railroad, at an easy grade, in a straight line, from a station near Chamonix to a point vertically under the peak of the mountain, ascending thence vertically, by a shaft nearly two miles high, to the terminus at the summit. The idea of designing railways straight upward is not quite new, for the Jungfrau road is to have a short vertical shaft; but the credit for the extension of the system, so as to climb mountains by a right-angled tunnel, two miles underground, is certainly due to M. Issartier.

THE practical engineer will probably remark that the sinking of a shaft two miles downward from the top of a mountain on which snow lies constantly to a depth of hundreds of feet is not a very easy matter; but here also the talent of this ingenious Frenchman displays itself. Instead of sinking his shaft from the top of the mountain, he proposes to cut it upward, from the station in the bowels of the earth, at its foot. For this purpose, he has devised a sort of caisson, furnished with springs, which, when the horizontal tunnel is ready, is carried in, and put together, and serves as the staging from which to cut the shaft. The springs are intended to receive the shock of the explosions incident to the rock-cutting, which is carried on from a temporary platform supported on the caisson, so that the latter may not be blown down the shaft, and a stone-crusher is mounted on the caisson, for the purpose of receiving the débris from the blasting, and reducing it to the condition of fine sand. Once brought into this condition, it is turned into the water-courses arranged in the horizontal part of the tunnel, and washed out at the mouth, the tunnel being graded so as to give a suitable flow. After the shaft is built, it is to be furnished with four toothed rails, up which the cars, or trains, will climb by electric-power. Notwithstanding the novelty of the scheme, it cannot be said that there is anything absolutely impracticable about it, and M. Issartier thinks that the cost of carrying it out would not exceed eight million francs.

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ART IN THE MODERN CHURCH.[1] — IX.

THE CHURCH INTERIOR.



The Paulsbrunnen, Erlangen.

HERETOFORE we have been concerned exclusively with the exterior of the church. And a more illogical method, architecturally speaking, it would be hard to find, since the architect, when he sits down to design a church, does not begin with the elevation, but with the plan, of which the elevation is only the expression. The exterior, of course, is but part of the design, and many will tell us it is less important than the plan. We need not stop to argue this point, but it may be well to remark that by far the larger number of people never go into churches at all, and those that do are familiar with but one or two. New York City, for example, has some hundreds of churches; but how many of its population are familiar with the interiors of more than two or three? How many know six or ten? How many know fifty? So the exterior of a church has an importance hard to be overestimated. Were it rightly designed, did it speak of God and His message to mankind, a dumb church exterior might convey the gospel message to many a hungry soul. It would not be a difficult task to justify the space already devoted to the exterior of our churches.

It need hardly be said that the Christian laws governing the exterior of the church are as imperative within as without. The Christian building is not a structure that shows the faith by its outer side alone, but it gives its testimony in every part. Such examples as we have studied have been viewed solely in their external aspects; it now remains to briefly consider the interior. Few architectural subjects are so difficult to illustrate as church interiors. If it be a Gothic building, the long aisles, lined with lofty columns and covered with a high vault, become, even in a photograph, dimensionless spaces enclosed with unmeaning lines. If it be a domed temple of the Renaissance, its crowning glory can seldom be seen from one point-of-view, and so the picture in both these great cases, under which most church interiors can be classified, wholly fails in illustrating what it purports to represent.

We may, therefore, dispense with illustrations of the special branch of our topic we are considering. But it should be remembered that the interior calls for the same developed treatment in a Christian style as the exterior. The faithful, when they congregate in the churches; the curious, when they are drawn thither by some noted "attraction"; even the scoffer and the unbeliever who come that they may find weapons for their unholy war; all must find in the church interiors the expression of Christian hope and faith that is the essential feature of the Christian life. The form of worship, the individual doctrines of a particular religious body, even the personal beliefs of a noted preacher have nothing to do with this fundamental fact, at once elemental and essential. In a certain sense the task of the Christian architect is easier within than without. He cannot build towers within, nor can he introduce the many varied features which he applies to his exteriors in the delusion that he is creating a peculiarly Christian and inspired structure by their use. Opportunities for personal eccentricities are rarer than without, and in the sobered conditions of the internal problem he can obtain a more satisfactory result with comparatively simple materials.

But the architect should not rest satisfied with a result that is "satisfactory" and no more. That in itself is something, but it is not the goal he has started for when he set out to design a church. Rather, it is not the goal he should aim at, for usually he thinks there is no higher end than this. A church interior may be satisfactory, and yet not be Christian, since many good and wholesome things in this life are satisfactory without being in the least religious, having, in truth, no religious signification. But the church architect can never get away from the sacred associations of his structure. His aim must be to create an interior that shall be at once sacred and holy, inspired, reverential, devout.

This I have already had occasion to remark time and time again in these studies. But it is not useless to repeat it here, because the idea with which our church interiors are designed so frequently ignores this elemental condition. How often do we judge of the success of our church interiors by the distinctness and ease with which the preacher may be heard in every part! Or, how pleased are we apt to be if the preacher and the choir are readily visible from the most retired corners! Or how delighted with comfortable seats, with broad aisles, with deep-toned glass! Just so the savage is fascinated with a string of glass beads, the child with a row of mud-pies. All these phenomena are akin, or the former series but a survival of the latter in a more advanced state. A comfortable seat in a church is not to be despised; in a measure, it conduces to godliness, since an uncomfortable one might create mental and physical conditions incompatible with a pious frame of mind. And if we wish to hear the preacher it is an advantage to be able to hear him easily and readily, though the value of the ability to see him utter the words of his discourse is less certain. As for the stained-glass and other internal decorations, we may leave them until we take up the subject of church ornament a little later. But neither the most comfortable seats in the world, nor the most perfect acoustics will create a religious architecture, a sacred art that shall speak of God and of the story of the gospels. These are mere incidentals, the trimmings, as it were, of the structure whose art, given it by the architect, must speak clearly and in no uncertain way, of the most precious possession of humanity. We can enjoy comfortable chairs without going to church to sit in them; we can hear agreeable speakers in halls delightful to speak and to hear in, without partaking of a church service. Neither of these things, therefore, contribute essentially towards the success of a Christian interior.

Modern religious development has divided Christian churches into two great classes, the liturgic and the non-liturgic. In the latter the preaching service is the most important, and the church building becomes, practically, if not actually, a preaching hall. In the former group the ceremony of the altar is the essential service, which is conducted with more or less ceremony of physical worship. So far as the uses to which the churches of these two great bodies is put is concerned, the distinction between them is broad and definite; yet over and above the difference in forms is the common ground of Christian belief and faith in God. Whatever the worship, how elaborate soever the ceremony, how important the sermon, this one great fact remains at the foundation of the superstructure. It is as essential, therefore, that the lecture-hall set apart exclusively for Christian worship, should illustrate the same Christian trust and faith as appears to be naturally expected of those religious bodies which retain the altar ceremonial. It need not follow the traditional form of the church building, it need not seek to be other than what it is, but it must express its purpose as clearly and as distinctly as the liturgic church. This is the standpoint from which the architect must start, though he has seldom, if ever, done so in the lecture-hall church.

The preaching service has called into existence the amphitheatre type of church which, in a certain sense, is wholly modern. That it is *a* modern form may be admitted without debate; that it is not *the* modern form is evident from the continued growth of the liturgic churches, and even the approximate reproduction of their architectural characteristics by non-liturgic bodies. The popularity of this plan in certain denominations has become very great, and that it corresponds to certain needs cannot be denied. For the Christian architect, its chief interest is its individual treatment and its influence upon the form and the style of his building. It wholly ignores the traditionary church building, but it is seldom this is frankly admitted in the exterior.

A church which has already been adverted to (Fig. 31) is one of the freest expressions of the ampitheatre in external design we have, though, while the architect has utterly cast aside the traditional materials, he could not wholly rid himself of the idea of a façade flanked with two towers. It is seldom that a modern architect goes as far as in this building. Usually the ampitheatre is encased in a building that approximates the traditionary form; a rectangle or a square usually entirely conceals the inward form. Various expedients are resorted to in order to obtain the circle within the rectangle, the most successful being a diagonal plan, with the pulpit in one corner and the rows of pews radiating from it. This is ingenious as well as economical of space, but it would be difficult to imagine a greater falsehood. The mightiest amphitheatre the world has seen, the Colosseum at Rome, derives its imposing dignity quite as much from the frankness of the expression of the plan as from its gigantic proportions. We do not build churches on so splendid a scale, and probably never will, but this pagan edifice shows us how to design an amphitheatre, and incidentally it shows us what a pagan sort of a structure that kind of a building is!

But it is not necessary to argue the pagan significance of the amphitheatre. It has been accepted by many Christian bodies as the form most convenient to their worship, and it has thus become a type of Christian edifice whose development has taken place solely within our own time. Yet this development and adaptation is not without significance to the Christian builder. *Its importance in modern*

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1041, page 110.

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church architecture would scarcely have arisen had it not been supposed that a building convenient to see and to hear in was the perfect form of Christian building. That it is admirably suited to these purposes cannot be denied; but the importance attached to these unchurchly, irreligious conditions has attained its legitimate end in these unessential things becoming the chief consideration in the church building. The amphitheatrical church is, therefore, the result of an ignoring of the Christian element in architecture.

Having originated in error and been perpetrated in misunderstanding, it is not, on this ground, to be considered without the pale of Christian buildings. God is worshipped in such a building as truly (from the standpoint of the worshipper) as in the edifice wherein is practised the most elaborate ritual. Both, from their particular standpoints, are Christian, and each is as Christian as the other. Architecturally, therefore, the architect though working on different plans, and trying to meet different conditions, cannot distinguish between the Christianity of his architecture. It is as needful that one be Christian as the other. The spirit that dominates the one must be the spirit that dominates the other. God is present in both, and each is built to His glory and to the spread of His word. We come back, therefore, to our original proposition: "What is Christian is sacred, and where God is worshipped there must we have an art that breathes a religious and consecrated spirit, an art that rises above forms of worship and individual beliefs, and speaks only of eternal hope and faith and joy. That these qualities may be more readily expressed in one group of churches than in another does not diminish the architect's responsibility towards each. We cannot change the basic use of a church building unless we deny the existence of God, and prostitute it to pagan and unholy uses.

The problem of the church interior naturally divides itself into two parts, that of plan and that of detail, or of decoration. So far as the plan is concerned, the greatest importance rests upon the two-fold division that has just been discussed; the subject of decoration will presently be taken up under a separate heading. As to general form and style, it is essential that the architect remember there is nothing sacred in any one architectural element. All, even in the time of the utmost development of Christian architecture, have been employed upon secular as well as upon sacred buildings. It is feeling that makes a structure Christian — feeling, reverence, love, faith, hope. The ability to express these sensations in building materials is not given to every man calling himself an architect. But Christian architecture demands just these qualities, and unless they are contained in our church architecture, within as well as without, the building fails as a church and as a Christian building, be its seats as comfortable as they may, or its opportunities for seeing and hearing as perfect as modern ingenuity and science can make them.

DECORATION.

The decoration of a building, including in that term every description of ornament, detail, carving, painting, may naturally be considered under two great heads: structural decoration, or that which is an integral part of the structure, and which in the epochs of pure architecture aided as well as illustrated the architecture; and applied decoration, which has no structural signification, and which may be varied or removed at will without affecting the integrity of the architecture. When, for example, we enclose a doorway of a church with a carved frame, or throw a richly sculptured arch over it we have an instance of structural decoration, since the carving upon the *voissoirs* is an integral part of the structure, and has the further advantage of expressing the construction by enriching it at an important point. On the other hand, if we apply a painted frieze to the walls of our church, or set up a statue in a niche, we have an instance of applied decoration, since either may be removed at pleasure, and in neither case is the structure of the building affected, though its aspect may be considerably modified.

Structural decoration is, of course, an integral part of the architecture. It has, therefore, as important a part to play in the appearance of the church as the materials of the walls, the form of the floor-plan, the shape of the openings. It cannot, in fact, be separated from the architecture; for ornament and detail are sure tests of style, and in the hands of the archæologist become the surest test whereby the date of a building is determined, and therefore the style, or the phase of a particular style to which it belongs. The importance of architectural detail in the giving of Christian character to a church is not to be overestimated. Plan, form, style can not produce the desired effect unless the detail be characterized by the same reverential spirit that should be insisted upon for every part of the work. This requirement is so plain that it might seem needless to refer to it were it not that the term "Christian decoration" suggests possibilities that might easily be misunderstood.

If we must employ Christian decoration in the detail of our churches, must we, it may be asked, employ only the Christian symbols — the cross, the crown, the anchor, the star, to name but a few of the many forms that have a Christian meaning; must our painted figures be of angels only, and our models be based exclusively on the forms consecrated by long Christian usage?

Christian iconography is indeed a delightful and mysterious science, or art, if you choose so to call it. It is concerned with a multitude of emblems, symbols, legends, suggestions, ideas that have grown up around the Christian faith as it descended through the ages. Its material is almost inexhaustible, and it covers every possible field; yet the vast array of facts it has accumulated for our benefit has been gathered through a great space of time, and in a territory bounded by the influence of the Christian religion itself. Its very distribution and immensity are themselves evidences of no mean order that Christian decoration is not synonymous with the emblems consecrated to Christian usage or endowed with Christian meanings.

Let us take, for example, any great Gothic church; it matters not whether it be Amiens or Chartres, or Paris, or Rheims. The structural ornament, in any case, will be of immense variety, running from symbolic representations of the Godhead to the rich treasury of nature's forms. The typical decoration of a great Gothic interior is the capital and the string-course, the boss at the apex of the vault, and perhaps a leaf at the angle of the column base. There is scarcely a church or a cathedral in all Europe where, in these parts, one may see Christian emblems cut in imperishable stone as part of the structural ornament. Nature has been the model, the leaves and flowers, the buds and grapes; these form the base of the larger part of the decoration of the great Christian edifices of the finest periods of Christian art.

This patient going to nature for inspiration by the mediæval sculptor, this translation of the delicate forms of vegetation into stone, and the setting of them upon God's house, as in their original, fair state they adorned God's hills and meadows, teaches many a lesson besides that which may be drawn from it in connection with Christian ornament. But this is the only lesson we are concerned with, and important enough it is. Christian emblems have their proper place in the decoration of the Christian church, but they are not the materials to be employed in their structural decoration and that certainly is the great lesson taught by the decoration of the churches of Europe, and that is the chief lesson we have now to remember. The world knows no purer, fairer thing than the flower of the field or the leaf of the tree; what more proper than to employ God's most delicate creation in the adornment of His churches? It is enough that this was done in the time when the great buildings we now look upon as models of Christian architecture were built.

Christian decoration, therefore, does not imply the reproduction of set series of forms that are to be repeated without end under every possible circumstance. On the contrary, history and analogy teach the freest use of every material God has given us. But this use is not to be promiscuous, careless, thoughtless or irresponsible. The precedent to use everything we have does not give us the privilege of using all sorts of things in all sorts of ways. Time and again in these papers has the importance of Christian feeling been insisted upon as the fundamental element of Christian architecture. It is so also with ornament. To find a place in the house of God, the ornament must be refined and chaste, beautiful and appropriate, and conceived and carried out in a reverential spirit as befits an undertaking for the glory of God. The ornament must, therefore, whatever its materials, be endowed with the same Christian feeling and quality that should be an integral part of every Christian church.

The license to use every form of nature in Christian ornament rests upon this fact. Ornament, even a strip of foliage, can have a character we instinctively recognize as religious, as Christian, as sacred, though no emblem of Christianity or deliberate reference to its use be contained in it. In other words, it is not the material, the substance, the objects represented in Christian ornament that make it proper for the church, but its quality. Christian architecture, as we have seen, is not concerned with forms, but with the quality of forms; and it is the same with detail and with ornament, wherever found and employed. Were it otherwise, we should find Christian builders employing a limited number of forms which would have acquired a certain sanctity by their repeated reproduction. The limitless opportunities which Christian designers opened up for themselves in going straight to nature would otherwise never have been availed of. Christian ornament would then have become cold and hard, the freedom of the artist would have been restricted at every point. He would, in truth, have become as unskilful in his task as the Mohammedan artist in the reproduction of the human and animal form, while his detail, in the end, would have grown no more ornamental and pleasing than the letters of the alphabet. Fortunately the early builders of Christian churches felt sufficient reverence for their task, realized sufficiently well the consecrated work before them, to give to their undertakings that admirable quality of faith and love that impressed its character upon every part, that rose above forms and ideas, and though subtile and indistinct in itself, still dominated the whole edifice. Barr Ferree.

[To be continued.]

An Elizabethan Tomb. — A superbly rich Elizabethan tomb is left to us in Boreham Church, Essex. This was erected to the memory of Thomas Radcliffe, Earl of Sussex, Lord Chamberlain, and known as the stern opponent of Leicester. Three knights in martial costumes lie on the tomb slab, one of whom is his son and the other his grandson. Walpole incidentally states that the Earl bequeathed £1,500 to be expended on this tomb, and that his executors agreed with a Dutch sculptor, Richard Stevens, to execute his part of the work for £292 12s. 8d. The Earl and his son were first buried in the Church of St. Laurence Pountney, in the metropolis, and then removed to Boreham at the instance of the grandson. — *Cornhill Magazine.*

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A STUDY OF THE HEATING AND VENTILATING PLANTS IN THE SUFFOLK COUNTY COURT-HOUSE AND THE MASSACHUSETTS STATE-HOUSE, BOSTON.[1]

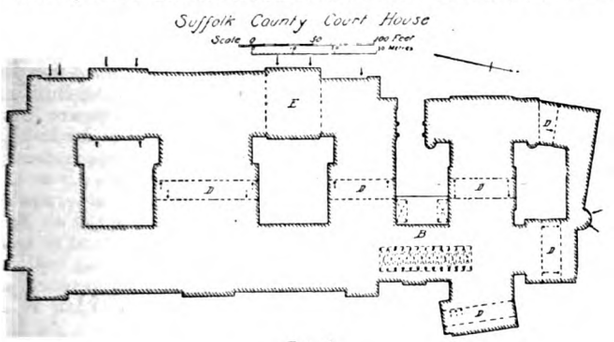


FIG. 1.

THESE two buildings are so nearly alike as regards size, exposure and conditions of use, that a study of their heating and ventilating equipments and some of the results obtained will, I hope, prove not uninteresting.

But while the buildings are so nearly similar, the heating-plants differ from each other very radically and at very many points, both in general design and in detail; in fact, there is hardly a single feature which is common to both.

In each case the selected engineer was in consultation with the architect while the building plans were being prepared, and his suggestions were followed wherever practicable, though in the case of the Court-house some progress had been made on the foundations before such consultation, so that the engineers were at a disadvantage. In both buildings the uses to which the different rooms were originally assigned were in some instances changed, during or after construction.

I will first call your attention to the ground-plans of the two buildings which are shown in outline, Figures 1 and 2, on the same scale, and from which you will readily see that the area covered by each of the buildings is somewhat alike. The State-house, however, is actually the larger of the two, careful computation giving the figures in Table I.

TABLE I.

	Court-house.	State-house without Bulfinch portion.
Cubic capacity	5,500,000 cubic feet.	6,200,000 cubic feet.
Area covered	65,300 square feet.	67,000 square feet.
Heating surface — direct	35,800 "	15,000 "
Heating surface — indirect	67,000 "	9,560 "
Total heating surface	102,800 "	24,560 "
Cost of building	$2,700,000	$3,000,000
Cost of apparatus	$122,000	$112,000[2]

For the purpose of this paper we will leave out the Bulfinch portion of the State-house, shown at the extreme left of the plan. This is the original building, erected in 1798, the proposed destruction of which has recently brought out such strong protests from many good citizens of Boston. A steam-heating plant was installed in this building in 1867, and has since been modified — the original fan for the ventilation of the House and Senate Chamber being replaced by one of more modern type about fifteen years ago.

The Bryant addition, on the north side of the Bulfinch Building, was built in 1855, and has now been pulled down and is being rebuilt in conformity with the design of the "Extension." Mount Vernon

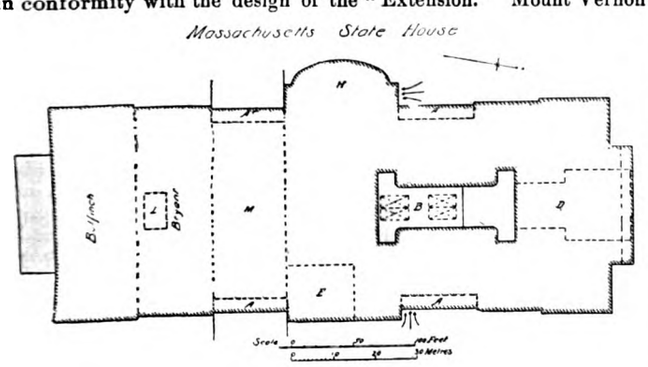


FIG. 2.

Street runs under the portion marked *M*, which, in consequence, has no basement or first floor.

The wing at the right, on the Court-house plan, is the Municipal Building, and contains the City Prison and the Criminal Court-rooms. The remainder is the County Building, devoted to court-rooms, rooms for judges, lawyers and juries, and the Law Library, which occupies nearly the whole of the front of the building on the third floor.

The heating and ventilation of the Court-house is accomplished by a hot-water apparatus, operating without pressure except that due to the head of water in the system. The boilers are placed below the lowest radiating surface, special excavation (which on account of the foundations being already in place, was very costly) having been made for this purpose. *B* on the plan indicates the boiler-room. The water being heated in the boilers to a temperature varying according to the weather, from 80 to 180 degrees, flows through the supply mains and their many branches, rising till it reaches the various radiators, in which it is cooled, and then flows back through the return-pipes into the boilers again — without the invention of any traps, tanks or pumps — arriving at a temperature averaging 15 degrees cooler than when it began its journey. The usual expansion-tank is provided at the top of the building, and the water-level in this tank is maintained automatically. The air-vents of all the indirect radiators are connected to two 1½-inch mains, which are run to the top of the building and have a free discharge. The direct radiators are provided with ordinary air-cocks.

The rooms are warmed partly by passing the air supplied to them through large return bend-coils of 3-inch cast-iron pipe placed in brick chambers at the base of the several flues, and partly by horizontal wrought-iron tube radiators located in the window recesses.

Ventilation is effected without the use of any moving machinery. The tunnels or corridors in the sub-basement, which contain the large hot-water pipes, serve also as main fresh-air ducts to those rooms which can be reached from them. The court-rooms have, as a rule, independent fresh-air inlets.

The air-inlets to the rooms are, in most cases, on the warm or inner side, and are placed at the floor. All the court-rooms, however, have two opposite exposed sides, and in these cases there is an air-inlet at each corner on one exposed side, and a corresponding outlet flue on each corner on the opposite side (as shown in Fig. 6). The outlet flues have registers both at the ceiling and at the floor. With this arrangement of air-inlet and with no means for diffusing the air as it enters, it is not surprising that when weather conditions are favorable, and the volume of entering air large and its velocity consequently high, draughts are complained of by persons sitting near the supply-registers. To avoid these, screens or baffling plates have, in some cases, been provided, and in some cases the inlets have been raised a few feet above the floor. The efficiency of the air circulation in a room so arranged is evidently open to grave suspicion, for it is obvious that as regards the two exposed sides it cannot possibly be symmetrical. The entering air, being warmer than the air of the room, a large proportion of it — especially where the screens are used — will rise immediately to the ceiling and then gradually find its way down the cooling surface of the windows towards the floor. That portion of it which flows down on the side where the inlets are placed will have to cross the room to the outlets at a low level and will do useful work, but that which comes down on the other side can reach the outlets almost without working its passage, and except for the foul air at the ceiling — which, doubtless, it does help to dilute and displace — it would be almost as pure when it left the room as when it entered it.

The temperature in the rooms is regulated very approximately by the temperature of the water in the main supply-pipe — a thermometer being placed in this pipe for the guidance of the engineer, who varies the condition of his fires and the number of boilers used, according to the outside weather. A further regulation in any particular room is effected by operating the valves of the direct radiators under the windows, or by changing the position of the mixing dampers which are provided for all the court-rooms.

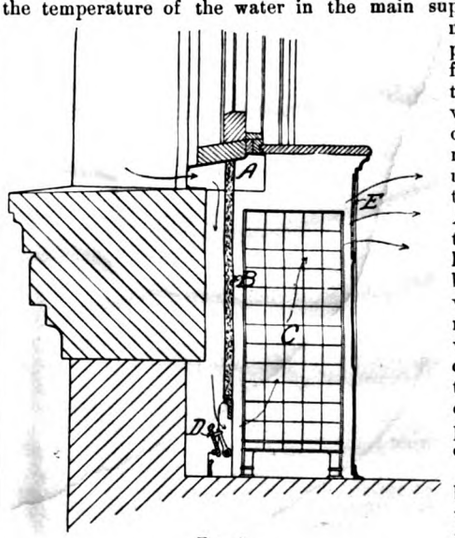


FIG. 3.

It was prophesied before the apparatus was completed, that a large corps of supernumerary engineers would be needed to regulate, with every change in the weather, the many valves and dampers which form a part of the apparatus. This, however, does not prove to be the case; in the court-rooms the mixing dampers are rarely touched except when something of unusual interest is going on, and the room is consequently crowded. Then the adjustment is usually made by one of the two engineers. In the smaller private rooms the radiator valves and cold-air dampers are

[1] Read before the Association of Engineering Societies, September 18, 1895, by Percy N. Kenway, Member of the Boston Society of Civil Engineers, and printed in the *Journal* of the Society.

[2] This includes $6,000 for temporary apparatus for drying the building, and $4,800 for air-filters.

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controlled by the occupants, while in the jury and other rooms — which have no air-supply flues, and are not occupied constantly by the same persons — the valve wheels have, in most cases, been removed as a safeguard, and the temperature of such rooms is dependent on that in the apparatus and on the amount of air admitted behind the radiators.

The ability to approximately regulate the temperature in such a large building from a central source is undoubtedly one of the strongest arguments in favor of a hot-water apparatus as against steam. A range of temperature extending over more than 100 degrees Fahrenheit is at the disposal of the engineer, without in any way straining the apparatus or increasing the pressure, whereas a pressure of about 70 pounds per square inch would be needed in the case of steam to get an additional 100 degrees over the temperature at the boiling-point. and such a pressure in a large apparatus, with many thousands of joints and fittings and some miles of piping, would be impracticable and even dangerous.

There are in the Court-house about 220 occupied rooms, including the large Law Library and some twenty other very large rooms used as court-rooms or rooms for hearings, but not counting toilet-rooms. The Law Library has a cubic capacity of about 132,000 feet, and the other large rooms average nearly 40,000 feet each. About twenty of these two hundred rooms are used for unimportant purposes and have direct radiation only, without air-supply. Ninety of them have direct radiators in the window recesses, enclosed in cast-iron casings and arranged to warm air taken from the outside through cast-iron sub-sills, as shown in Figure 3. *A* is the sub-sill; *B*, an apron of 1-inch hair-felt, cased in galvanized-iron, extending across the window recess; *C* is the radiator; *D*, a damper for admitting air behind the radiator, and *E*, the grating through which the air escapes into the room. The dampers are under the control of the occupants of the rooms, and, as a matter of fact, in cold weather most of them are closed, the occupants preferring to have them so. These rooms all have vent-flue connections, but no air-supply other than that admitted through the dampers *D*, so that, with these dampers closed, the ventilation cannot be very excellent. However, in most of these rooms the number of occupants is small and a large supply of air is not needed.

The remaining one hundred and ten rooms have both air-supply and vent-flue connections, in addition to the direct radiators in the window-recesses. These radiators, however, have no sub-sill air-supply, but are simply enclosed in cast-iron screen-work, with gratings at the top and bottom for the circulation of the air.

The corridors and hallways are warmed by indirect radiation, without air-supply from the outside. An air connection is made from the floor of the hall, or corridor, to the underside of indirect stack, and another connection from the top of the stack to the floor again, or to a register in the wall above the floor. In this way these spaces are warmed by circulating the air contained in them through the indirect radiators.

The amount of air supplied with this, as with any gravity ventilating apparatus, is dependent, first, on the difference between the inside and outside temperatures; second, on the direction and force of the wind; third, on the barometric pressure; fourth, on the amount of heat used in the aspirating coils in the vent shafts, and fifth, on the area, height and form of the supply and vent flues and their freedom from obstructions and changes of direction. From this it will be seen that the air-supply in this building is not likely to be constant, but must, of necessity, vary from day to day with the outside weather conditions. The severest test for such an apparatus is a spring or autumn day when the barometer is low, the air still and the temperature a few degrees too cool for open windows. If the amount of air supplied on such a day is up to the standard, then, of course, it would be theoretically possible to keep the supply constant, and to have neither more nor less air than is needed at any time; but as this would entail, in the case of the Court-house, the very frequent, perhaps hourly, manipulation of seventy-four cold-air dampers, it would hardly be practicable, and as a matter of fact it is not attempted, although the dampers are used to check the flow of air to the rooms when it becomes too generous under favorable weather conditions.

Turning now to the State-house, we find there a steam-apparatus throughout. A pressure of 100 pounds per square inch is carried on the boilers for the purpose of running the engines in connection with the electric-lighting plant, but only from two to ten pounds is used in the heating-apparatus. The boiler-room is located in the court-yard of the extension — as shown at *B* on the plan — and its floor is about two feet below the level of the sub-basement. It is a one-story structure, the roof being largely of glass, making it an exceptionally light room.

The different pressures carried and the high pressure needed for the engines made a gravity apparatus impracticable in this case, and consequently the water-of-condensation from all the direct radiators and from the main coils — with the exception of the exhaust steam-sections — is returned to the boilers through a series of traps, tanks and pumps. The rooms here, as in the Court-house, are warmed partly by the air-supply and partly by direct radiation; but in this case the indirect radiation, instead of being divided up and placed at the bases of the several flues, is massed in large stacks near the main air-inlets. The two sets of stacks, through which passes all the air supplied to the Extension (the whole building, except the Bulfinch and Bryant portions) are built of 1-inch wrought-iron pipe, and are made up of a series of mitre coils set up on end and connected together in sections. The arrangement will be better understood by referring to Figure 4, which shows one of the coils and its relation to the floor and ceiling. The largest stack contains ninety of these coils, connected together in groups of ten, each group having separate controlling-valves.

Ventilation is effected by fans driven by electric-motors, and for this purpose the Extension is divided into two sections, the Bulfinch and Bryant portions, together, making a third, so that there are three supply-fans and three sets of main coils. The general method of ventilation can be understood from a description of the apparatus on the west side, which is the more interesting as it supplies air to the House of Representatives. The air-inlet is on the west side, and is indicated by arrows on the plan. On its way to the fan the air first passes through a series of primary coils, which are designed to heat it to about 40 degrees in zero weather. Between these coils and the fan there is a large chamber in which it was designed to place an air-filter; but this has not as yet been constructed. The fan is 12 feet diameter and 14 inches wide at the tip of the blades. It is a cone fan of the Briggs-Meigs type, modified by Professor Woodbridge, and has proved very efficient and economical of power. The one on the east side is of the same type, but two feet less in diameter, as it has less work to do.

After passing through the fan the air is forced through a secondary coil, and is further heated to about 75 degrees, at which temperature it is distributed through the vertical ducts to the different floors. The total area of the main air-supply ducts on this side is 145 square feet, 45 square feet being for the House of Representatives. Horizontal branches are taken out of the vertical ducts at each floor for the purpose of distributing the air to the rooms. These horizontal ducts are formed by furring down the ceilings of the corridors, so that they are not visible, and by the casual observer would be unsuspected. The air-inlets to the rooms are in most cases taken directly out of these corridor ducts, so that they are on the inner side of the rooms and usually something less than three feet below the ceiling. The vent outlets are, in nearly all cases, at the floor, and, wherever practicable, on the warm side, and are furnished with gossamer check-valves to prevent down-draughts. No ceiling outlets are provided and the floor outlets have no register valves. Some of the rooms which could not be reached from the corridors have separate air-flues leading up from the sub-basement, and connected to the warm-air chamber by galvanized-iron piping. In these rooms the air-inlets are about eight feet above the floor.

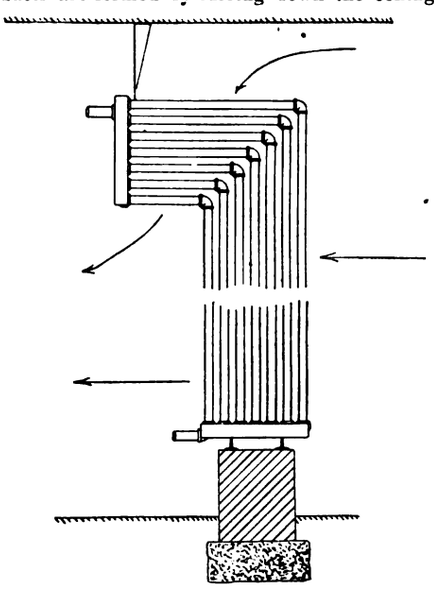


Fig. 4.

The House of Representatives, the location of which is indicated by the letter *H* on the plan, is elliptical in form, 86 feet long by 70 feet wide and 44 feet high, has a cubic capacity of about 264,000 feet and seats 240 persons on the floor and about 200 in the galleries. On special occasions, when the standing-room is occupied, as many as 1,800 persons may be inside the doors at one time. This chamber is treated in a special manner, the conditions being different from those existing in the other rooms. A special vertical air-duct is provided, which has two openings at the base, both connecting with the air-pressure chamber, but one connecting on the inside and the other on the outside of the secondary coil, so that air at 40 or at 75 degrees, or at any intermediate temperature, as required, may be supplied. Mixing-dampers, automatically controlled by thermostats, are provided in front of the openings and keep the temperature of this important legislative chamber practically constant, in spite of variations in the weather and in the number of occupants. The air-inlets to this room are differently arranged from those in the other rooms. The desks on the floor and the seats in the galleries are fixtures, and the floors are raised and inclined in such a manner as to give a considerable air-space between them and the ceilings below. Into these spaces the air from the vertical duct before mentioned is discharged, so that they become air-pressure chambers. The desks are of special construction and have hollow bases which connect with the air-chamber below, and the air finds its way into the room through gratings (backed by coarse haircloth) in these bases and in the risers of the floor, which is stepped. The gallery inlets are somewhat differently arranged, though the same principle of a large and evenly distributed inlet area near the floor and a low velocity of air-flow is carried out. The total area of inlet is about 240 square

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feet for the floor and 200 square feet for the galleries, or one square foot for each regular occupant.

The main vent outlet is at the ceiling, where a free area of about 20 square feet is provided, but there are also 16 square feet of outlet area in the rear walls for the galleries. The ordinary air-supply to the House is 900,000 cubic feet per hour, but it has been found quite possible on special occasions to raise it to 1,300,000, and that without causing disagreeable draughts. Samples of air taken at the ceiling ventilator towards the close of the exercises on the occasion of the Governor's inauguration last January, when fully 1,800 persons were inside the doors — more than four times the seating-capacity — gave by the Pettenkoffer method 12.1 parts of carbon-dioxide in 10,000 — a large proportion under ordinary circumstances, but a very satisfactory showing considering the adverse conditions and the fact that the samples were taken at the point of maximum impurity. It may be mentioned incidentally that a Wolpert air-tester, carefully used at the same time and place, gave but 8½ parts CO_2 in 10,000, indicating an error in the latter instrument of more than 30 per cent. As the Wolpert device is used by the District Police in testing the air in the school-houses of this State, this fact has some significance.

The warming of the House is done entirely by the air-supply, no direct radiators being used. The temperature of the incoming air, when the room is occupied, rarely exceeds 70 degrees in the coldest weather.

The temperature of the air-supply and of the rooms and corridors throughout the building is automatically controlled and kept constant within one or two degrees by the Johnson Electric System, so long as the weather is cold enough for artificial heat to be required. Thermostats are placed in the main air-ducts and control sections of the main coils, and in each of the rooms and in the corridors there are other thermostats controlling the valves on the direct radiators. The mixing-dampers above mentioned, which regulate the temperature of the air to the House, are also controlled by the Johnson System. *No valves or dampers are accessible to the ordinary occupants of the building, or need to be operated or thought of by them.*

In the completed building there will be about 200 occupied rooms, including the House of Representatives, the State Library and the Senate Chamber. Of these, 170 will have connection to air-supply and vent flues as well as direct radiation. The remaining thirty include such rooms as the restaurant and kitchen, and the Board of Health laboratories on the fifth floor, which have liberal vent connections, but take their air-supply from the hallways and corridors; and the stack-rooms, on the third floor, through which the air from the State Library passes on its way to the vent outlets. The advantages and economy of such an arrangement are obvious. The large volume of nearly pure air at the top of the building is utilized, and a continuous inward current is insured towards those rooms which might otherwise be centres for the distribution of foul odors throughout the building. Similarly, all the toilet-rooms, instead of having their own air-supply flues, as is the case in eight of the large toilet-rooms in the Court-house, take their supply from the corridors through gratings in the lower panels of the doors, and the vent-flues from these rooms are all connected to an exhaust-fan which is kept running continuously. Exhaust-fans are also provided for the kitchen and restaurant, and for the laboratories, and these are run intermittently as needed. Ventilation in the stack-rooms is required principally for the preservation of the books, so that the air from the library, which is usually a very thinly populated room, is entirely pure enough for the purpose, and it would, in fact, be wasteful to use fresh air.

There is a fourth exhaust-fan in the State Police department in the sub-basement, where confiscated liquors are disposed of. This was not anticipated in the original design, but was found necessary on account of the strong fumes liberated.

All the fans are run by electric-motors. Vent-flues, other than those mentioned above as being connected with fans, are merely carried up above the roof and suitably capped. No aspirating coils are provided or needed.

The total amount of air which the apparatus is capable of supplying to that portion of the building known as the "Extension" is 10,000,000 cubic feet per hour, or, say, 50 cubic feet per minute to each of 3,300 occupants. Add to this 2,500,000 cubic feet per hour for the Bulfinch and Bryant portions, and we get 12,500,000 cubic feet as the total for the completed building. This amount, it should be noted, is practically independent of outside weather conditions, and is well under the control of the engineer, who can reduce it as may be required. It is, of course, dependent on the fans and motors; if these should become disabled, then the air-supply would be very greatly reduced, and with unfavorable weather conditions this building would be worse off than the Court-house. But such a contingency is not likely to occur except at long intervals, and even then the stoppage would be of short duration and would not interfere with the use of the building.

We now come to the consideration of some of the details in the two buildings.

In the Court-house there are twelve horizontal tubular hot-water boilers of 80 nominal horse-power each, and two steam-boilers of the same type of 50 horse-power each, making a total of 1,060 nominal horse-power. The steam-boilers are for the elevator-pumps and have no connection with the heating-apparatus, except that the exhaust steam, after passing through a feed-water heater, escapes to aspirating coils in two of the vent-shafts. There is no electric-lighting plant in the building. Of the twelve hot-water boilers, eight have been found sufficient in the coldest weather experienced since the apparatus was installed. The firing is done by hand, Cumberland coal being used.

In the State-house there are four Babcock & Wilcox boilers of 208 nominal horse-power each, or 832 horse-power in all. These boilers are designed to supply steam to the entire heating-apparatus, to the elevator-pumps, and to a 5,000-lamp electric-lighting plant. Last winter, beginning with January, the entire building — except that portion marked *M*, which was not built — was warmed by steam from these boilers, as was also a large building across the street on the east side, known as the Commonwealth Building. The electric-current was at the same time supplied to 3,500 16-candle-power lamps, or their equivalent, and in the coldest weather only three out of the four boilers were used, showing that there is an abundant reserve force to take care of the whole building when completed. Roney mechanical stokers are used for firing. The coal is brought from the bin in a steel car running on a 2-foot track, is weighed and shovelled into hoppers secured to the boiler-fronts above the grates.

Special arrangement has been made for the disposal of ashes. Between and below the two pairs of boilers there is a fireproof chamber with connection to each of the four ash-pits; the ashes are dumped into this chamber and do not appear on the floor of the boiler-room at all. A mechanical conveyor raises the ashes out of the chamber and deposits them through a chute outside the boiler-room wall, ready to be carted away.

In a hot-water apparatus we should naturally expect to find the supply and return pipes of a larger size than those in a corresponding steam-apparatus, so here, in the Court-house, the main supply-pipe or drum is 30-inch internal diameter, with 14-inch connections

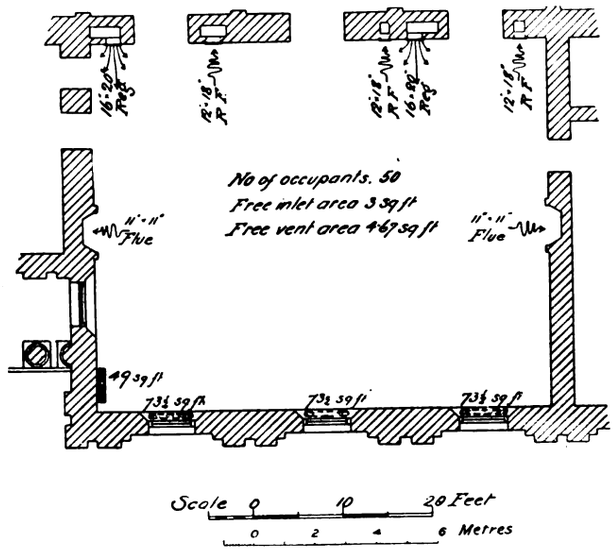


FIG. 5.

to twelve boilers. In the State-house the largest supply main is 10 inches, with 8-inch connections to four boilers. The return mains in the Court-house are the same size as the corresponding supply-pipes, the return drum being 30 inches in diameter, whereas the largest return main in the State-house is only 3½ inches in diameter.

All pipes in the Court-house larger than 5 inches in diameter are of cast-iron, flanged. No cast-iron pipes are used in the State-house.

In the Court-house the supply and return mains are in the sub-basement; the larger pipes run in the fresh-air supply ducts and are covered with hair-felt and canvas, an excellent non-conductor for hot-water work, but objectionable from the fact that it has become infested with vermin. Each line of radiators has its separate supply and return riser, so that there are in the building 80 pairs of risers, not counting those which do not reach up to the second floor — 160 rising lines in all.

In the State-house the supply to the direct radiators is first taken to the top of the building by two 7-inch risers, and is thence distributed to the downward feed-pipes by mains running in the roof space and covered with asbestos-cement felting. Exclusive of those in the Bulfinch portion, there are 67 of these "droppers" or downward feeders which perform the function of carrying away the water of condensation as well as supplying steam to the radiators, so that no return risers are needed. The average size of these vertical pipes is very nearly the same in both buildings, about two inches in diameter. The "droppers" are concealed in slots in the brick walls, which are covered with cast-iron plates. These plates have perforations near the floor and near the ceiling, so that a circulation of air is maintained and the heat utilized. The ordinary pressure carried on the direct-radiator system is under 5 pounds per square inch.

The direct radiators used in the Court-house are constructed of 1-inch pipe screwed into cast-iron headers at one end and into return

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bends at the other, the bends being tapped left hand. They are practically ordinary pipe radiators set with the pipes horizontal instead of vertical. This form was adopted partly because of the ease with which such radiators can be made of varying heights, widths and lengths to suit the different window recesses and the amount of surface specified.

The State-house radiators are of the H. B. Smith Union pattern for hot water, vertical cast-iron loops connected together at top and bottom. Each radiator has a supply connection at the top and return connection at the bottom, both connecting with the same vertical pipe.

The amount of radiating-surface in the Court-house is vastly larger than in the State-house, notwithstanding that the latter is the larger building and has ample surface to more than meet all the requirements. I am not able to state exactly the area of the exposed window and wall surface in the two buildings, but it is probable that the proportion of such surface to cubic capacity is greater in the Court-house than in the State-house, and the actual figures might possibly show a surplus for the Court-house. Bearing this in mind, and also making liberal allowance for the fact that we are dealing with hot water in one case and with steam in the other, it is still very evident that an extravagant factor-of-safety was used in designing the Court-house apparatus.

For purposes of comparison I have selected a large room in each building, which will, I think, help to bring out this point more clearly. The room in the County building which I have chosen is one of the court-rooms on the second floor on the west side (Fig. 6), and the one in the State Building is on the third floor on the east side, and was originally assigned to the Secretary of State (Fig. 5). Their respective locations are indicated by the letters *E*, *E* on the floor plans. They were chosen with reference to their size and exposure, and by referring to Table II it will be seen that while the rooms vary very little in those particulars, yet the Court-room has 89 per cent more direct surface and 1,347 per cent more indirect surface than has the room in the State-house. It should be noted, however, that this difference is in part due to the use of hot water without a fan in one case, and steam with a fan in the other, and also to the fact that on account of the larger number of occupants in the court-room, a larger maximum air-supply has been provided for. But even when all this has been taken into consideration, the excess in the court-room is still very remarkable, and I do not think that "extravagant" is too strong a term to apply to the "factor-of-safety" there used.

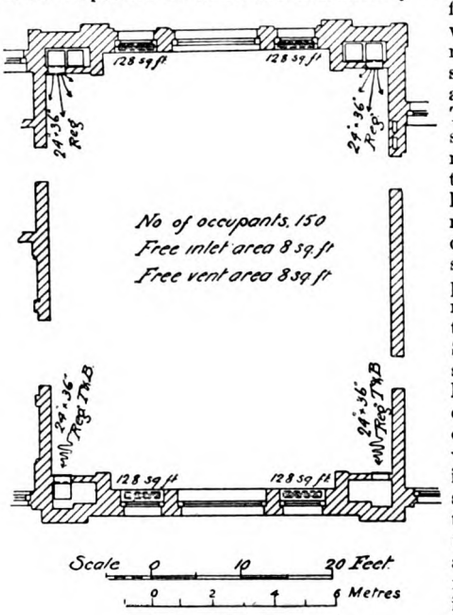


Fig. 6

The figure 85, which is given in Table II as the amount of indirect surface for the room in the State-house, is in the same proportion to the total indirect heating-surface on the east side (4,240 square feet), as the amount of air supplied per hour to the room (150,000 cubic feet) is to the total air-supply per hour (4,500,000).

TABLE II.

	Court-house, room 22, second floor.	State-house, room 113, third floor.
Floor area, square feet	1,813	2,090
Cubic capacity	38,300	39,700
Glass area	340	260
Exposed wall area	920	994
Glass plus wall	1,260	1,254
H. S. direct	512	270
H. S. indirect	1,230	85

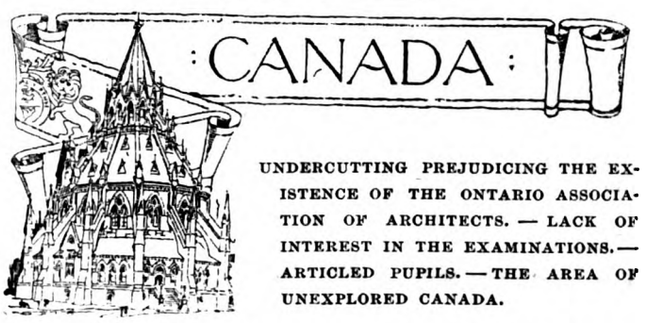
By referring to Table I, it will be seen that much the same proportions are maintained when the two entire buildings are compared. The Court-house, with 11 per cent less cubic capacity, has 318 per cent more heating-surface, and this is without taking into account the large amount of surface in the enormous supply and return mains.

With regard to the coal consumption in the two buildings, I have not found it possible to get data for a fair comparison. The amount used in the Court-house from January 1 to June 1, 1895, was 995 tons, and in the State-house for the same period, 1,465 tons. But it must be remembered that in the latter building there is a 5,000-lamp electric-light plant, some portion of which was in operation day and night, and that the Commonwealth Building, the Bulfinch and Bryant portions, and the Extension (except that part over Mt. Vernon Street), were all warmed during this period by steam from the new boilers. Also it should be noted that the north side of the Bryant portion and the south end of the Extension were then outside exposures.

The electric-lighting bill for the Court-house, covering the period above mentioned, was $3,030, which must be placed against the State-house expenses. This is enough to pay for the extra coal used in that building and leave a balance of $300 a month towards the heavier running expenses, but even then we do not get an accurate comparison, as many more lamps are used per hour in the State-house, and there are six elevators there against three in the Court-house.

The number of employés in the engineer's department is greater in the State-house than in the Court-house, partly because of the lighting plant, and partly because of the State law which limits the working-hours of State employés to eight in twenty-four, a law which does not affect the Court-house. There are in the State-house three engineers, six firemen, three oilers and two electricians, against two engineers, five firemen and one electrician in the Court-house.

The Court-house apparatus was designed by Bartlett, Hayward & Co., of Baltimore, and installed by the Samuel I. Pope Co., of Chicago. That in the State-house was designed by Prof. S. H. Woodbridge, of the Massachusetts Institution of Technology, and installed by A. B. Franklin, of Boston.



UNDERCUTTING PREJUDICING THE EXISTENCE OF THE ONTARIO ASSOCIATION OF ARCHITECTS. — LACK OF INTEREST IN THE EXAMINATIONS. — ARTICLED PUPILS. — THE AREA OF UNEXPLORED CANADA.

THE official report of the last annual meeting of the Province of Quebec Association of Architects, which took place early in October, makes one feel as if one had been struck below the belt. The vigor and enthusiasm with which this and its sister Association of Ontario were started a few years ago, still exist among the real workers and earnest members of both societies, but (and these members do not deny it or attempt to conceal the fact) the principal objects which it was their intention, if possible, to attain, or bring about immediately, are a long way still from consummation. The first object of all is being attained, undoubtedly, and therein these societies are doing good work, although the results are not by any means so gratifying as it was hoped they would be and the work of the members is carried on against depressing odds. This "first object" is, of course, "education of intending architects," but owing to the limited recognition these societies have as yet received and the opposition displayed by architects who desire to work untrammelled by regulation of any sort, students are doubtful of the advisability of spending time and money (though the fees are small enough) in taking the examinations provided for their benefit.

The Secretary of the Quebec Association, in his report for the year, stated that the question of the schedule of charges had not been materially advanced and to all outward appearances we might say it is almost in the same position as it was when the plan was proposed. Indeed, in Toronto — the residence of the majority of the Ontario Association members — the movement is not only at a standstill, but one might think it was abandoned. Very little, if any, allusion was made to the subject at the last meeting of that Association and so much opposition has been presented that there is little encouragement left to console the promoters.

There have been traitors in the camp, who, while professing horror at the bare idea of "undercutting," have been doing their "level best" to secure work at any cost and finding that the plan paid them well, through limiting their field of competitors (the exclusion of the best men being secured, through their adhesion to the promise not to undercut, left only the small fry to compete with), have finally overthrown all scruples about "low rates" and fallen out of the ranks of the fighters altogether. Traitors are bad enough, but a worse blow than a blow in the dark is one from a friend. One of the very most active agitators for a definite and binding scale of charges now states that he has thrown up the sponge, that the traitors have worked so well and so successfully, have obtained so much work at just whatever they could get it for, that they have done better than anybody who nobly stuck to his agreement, verbal only though it was, that now, not wishing to do anything in the dark, he gives it out that he will in future do as others do, and accept whatever is offered rather than lose a "job." A cause of failure to obtain recognition for a scale of charges has, undoubtedly, been indecision as to what that scale of charges should be. The

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Ontario Association, it is true, adopted, or professed to adopt, a scale, and a table of charges was printed for every member, headed "Scale of Charges in Use in the Office of ——," or something to that effect, and it was intended when a person represented himself as desiring to build, the architect, whom he addressed, should give him one of these printed forms. This should have been a well-directed shot, but it could not be fired, for the traitorous undercutters then had in their hands a definite statement of the charges that would be made by many men, and all they had to do was to say "*We* don't." So the subject has come to be looked on as a bugbear and it is apparently thought better to "let sleeping dogs lie."

The Quebec Association has not come to so baleful a decision, but in their fear that, if too determined, they would be snubbed altogether, alternative proposals made by the Government for the purpose of meeting them *halfway* were considered, instead of being met by the determined stand, that alone could command success, that "this we must have and nothing else." The alternative proposals were, first, an arbitration to decide upon items of charges and an opportunity to make them obligatory by law, the Association paying all expenses, or that the Association should issue a schedule and force it into use and that it should become law by long and united usage. The first would be a heavy tax upon the members of the Association and be doubtful of beneficial results in the face of the opposition that would be presented; the second, which, however, the members appear to prefer, was what was tried in Ontario and failed simply because "united usage" was an impossibility, and without that no length of time would be long enough for the object stated. And where are we now? The Quebec Secretary's report on this matter winds up with: "What arises from this is that the profession would gain enormously by a greater unanimity of action for the common interests of all." We are, therefore, just exactly where we were when the idea of forming associations of architects was first mooted in Canada; those words were what the provisional president or chairman of the yet unborn association made use of as the reason for the formation of an association.

A second important matter which was to be regulated by associating for the reform of abuses, is that of competitions. These were to be carried out on definite lines and according to settled rules, or all members of the associations were to abstain from competing. Here again the traitors got in their work, and though these have given signs of improvement, nothing really has been attained. The work of education goes on, it is true, but one is almost ashamed to report facts. At the Quebec examinations were there thirty candidates with, say, seventy-five per cent successful? Alas! there were only four candidates, but these four all passed, three in preliminary and one in final. Let us say, then, that the earnest working members of this association are worthy of great commendation in sticking to their posts, despite the wretched and disheartening response to their efforts on behalf of the students. In minor matters, however, the Association makes the fact of its existence felt and in so doing probably saves its life. If the public can be reminded from time to time that there is such a society, in time it may be found to be of value to the said public and be missed if it did not exist. The Art Standing Committees are good things, even if not so successful in getting their recommendations carried out, but the fact that their work, of suggesting improvements in thoroughfares from an artistic standpoint, necessarily brings them before the public, will show that the Association is not merely a social gathering or a "union."

It behooves all who are not traitors or turncoats to stand together closely, braced up to withstand the underhand opposition, determined to stick to their principles through thick and thin, and in time the desired results will be achieved.

It is very strange how little enthusiasm can be aroused in young students themselves for the future of the profession. The whole system of paying students salaries, however small, is a mistake, and yet it is difficult to break through what has become a custom. Boys, when they first go into an architect's office, think more about their pay than about study, and "articles" with an accompanying premium are almost unknown. The architect who pays his "pupils" without articles of indenture knows that if that pupil can get a little better salary in another office he will take it, and, therefore, he is not going to teach that boy more than he is obliged for the work of the office, for as surely as he does, just when he is beginning to get interested, and consequently more useful, the boy gets a "better offer" and decamps. Until the profession recognizes the necessity of binding students, and it becomes the practice among the foremost men, the education provided for by the examinations of the Associations of Ontario and Quebec will not be satisfactory in their results.

Dr. Dawson, Director of the Dominion Geological Survey, has published a paper, in which he gives the results of careful calculation as to the extent of unexplored areas in Canada. The total area, he says, aggregates 1,250,000 square miles. Beginning at the extreme northwest of the Dominion, the first of these areas is between the eastern boundary of Alaska — the Porcupine River — and the Arctic coast, consisting of 9,500 square miles, a little smaller than Belgium and lying entirely within the Arctic circle. The next area is west of the Lewes and Yukon Rivers and extends to the boundary of Alaska. Until last year there were 32,000 square miles unexplored, but last summer a part of this was surveyed. A third area of 27,000 square miles lies between the Lewes, Pelly and Stike Rivers, and is nearly as large as Scotland. Between the Pelly and Mackenzie Rivers is another large area of no less than 100,000 square miles, or about twice as large as England. It includes 600 lineal miles of the Rocky Mountains. An area of 50,000 square miles is found between Great Bear Lake and the Arctic coast, being nearly all to the north of the Arctic circle. Nearly as large as Portugal is the area between Great Bear Lake, the Mackenzie River and the western part of Great Slave Lake, in all 35,000 square miles. Lying between Stike and Laird Rivers to the north, and the Skeena and Peace Rivers to the south is an area of 81,000 square miles, which, except having been recently penetrated by a field-party, is quite unexplored. Another area of 25.000 square miles southeast of Athabasca Lake is an area of which little is known except that it has been crossed by a field-party *en route* to Fort Churchill. East of the Coppermine River and west of the Bathurst inlet is some 7,500 square miles, which may be compared to half the size of Switzerland. Eastward from this is an area about the size of Ireland, 31,000 square miles and lying between the Arctic coast and Backs River, and stretching to the Hudson Bay is another, larger than Great Britain and Ireland together, of 173,000 square miles. The most easterly area is the largest of all. It comprises almost the entire interior of the Labrador peninsula or Northwest Territory, in all 289,000 square miles, more than equal to twice the area of Great Britain and Ireland, with an added area of the size of Newfoundland. The Arctic islands will add an area of several hundred thousand square miles of unexplored Canada.

The largest steel arch bridge of single span that the world has yet seen is to be constructed immediately at Niagara Falls, in fact part of the foundation work, I understand, is already begun. It is intended to supersede the present suspension bridge, which has a long swing in the gales to the alarm of all passengers. The span will be nearly 900 feet, and the arch will spring from masonry carried down to the water's edge. Mr. E. C. Buck is the engineer.

An association for the encouragement of the art of sculpture has been formed in Toronto, under the style and title of the "Guild of Sculpture," supported by several prominent persons who have been roused up by the present increasing demand for public statues to arrange for the possibility of their being made in Toronto instead of being imported from the studios of artists in the Old World. The Association is well and substantially founded, and has for its president Mr. L. R. O'Brien, Canada's first artist and late President of the Royal Canadian Academy, the Honorary President being the Lieutenant-Governor of the Province.



THE ENGINEERS' CLUB OF PHILADELPHIA.

AT the regular meeting, held November 16, 1895, seventy-three members and visitors were present.

The paper of the evening, on "Paint as a Protection for Iron," was the joint production of Messrs. E. A. Custer and F. P. Smith (non-members), and was read by the former.

It would appear from past experiments that bright iron does not rust when exposed to a dry atmosphere of pure oxygen and carbonic-acid gas, separate or mixed. After the rust has once commenced, only the slightest trace of moisture is necessary to continue this chemical action, which is probably due, not only to the corroding influence of the rust already present, but also to its power of absorbing oxygen and condensing moisture. Any covering that is absolutely impervious to moisture will, when applied to clean iron, prevent rust under atmospheric conditions in which corrosive elements are wanting. The protective covering that is to meet these conditions must be cheap and easily applied, and a paint or combination of paints seems to be the logical outcome of the problem involved.

The requisites of a good paint for the preservation of iron and steel are stated by Mr. Woodruff Jones, A. M., to be:

1st. It should firmly adhere to the surface and not chip or peel off.

2d. It must not corrode the iron, else the remedy may only aggravate the disease.

3d. It must form a surface hard enough to resist frictional influences, yet elastic enough to conform to the expansion and contraction of the metal by heat and cold.

4th. It must be impervious to, and unaffected by, moisture, atmospheric and other influences to which it may be exposed.

In undertaking to produce a paint, with the above requirements, that would absolutely protect iron, it was early determined that the covering should consist of two distinct elements, the first of which should possess the adhesive and elastic properties, and afford a safe and elastic base for the application of a second coating that would be hard, elastic, acid-proof and absolutely impervious to moisture. There is no paint known that will meet the first requirement so fully as good red-lead and linseed oil. The dry film of red-lead and linseed oil, however, is porous, and this defect must be remedied by a second coating of paint, which will dry with an absolutely impervious and water-proof surface.

It has been justly claimed for red-lead that the property it possesses of saponifying the oil — not oxidizing it, in its true sense — renders it one of the most valuable pigments for a first coating on

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structural iron. After numerous experiments, a vehicle was finally selected as affording the nearest approach for an ideal outer covering for ironwork.

The pigment was next considered and it was decided that this must itself be inert so far as iron is concerned; for while it was intended to be used over a foundation coat of red-lead, it should be possible to employ it in some cases as a sole protective covering. A material was incorporated in the pigment, which enables it to resist frictional action in the highest degree, makes it practically impossible to destroy, and to all intents and purposes absolutely insoluble in any of the known solvents.

One important point that must be carefully considered when the protection of iron is desired, is the presence of mill scale or iron-rust. No paint, however good, is worth a cent a ton for the protection of iron when used over mill scale. The absolute removal of mill scale from the iron before it is painted should, therefore, be specified and insisted upon. In ordinary practice it has been found sufficient to brush the surface of the iron carefully and thoroughly with a good wire brush and then apply the paint.

Attention was then called to the quality of the paint to firmly adhere to the surface of iron when subjected to very high or low temperatures, and some specimens of pipe were exhibited that were first coated when cold with the protective paint referred to, and were then subjected to live steam at a temperature of 340°, then painted while hot with the same preparation, and afterwards dipped in a mixture of ice and salt until thoroughly chilled.

DISCUSSION.

Mr. G. B. Price: Am I right in supposing that the first coat of red-lead fills-in the pores of the iron, while the second gives a hardened surface?

Mr. Smith: The first coat does not necessarily fill up the pores, but it makes the surface of iron glossy and smooth, and the second coat gives it an enamel surface. The most severe test that we have given our paint is in a place where it has been exposed to the fumes of sulphuric and muriatic acid for nearly four years. It shows no signs of deterioration yet, although the first gloss has disappeared, but a careful examination of the iron, after scraping away the paint, shows that it has been perfectly protected. Ordinary paint, under the same conditions, would not have lasted more than two years. This paint has also been used largely for the protection of smoke-stacks and for boiler-fronts, where it has lasted for nearly a year. It does not crack under a high temperature. In structural work, the first coat is usually applied at the shop, and the finishing coat is put on after erection, as it would very likely be marred in putting the iron together.

Mr. John C. Trautwine, Jr.: While not bearing directly upon the subject under discussion, it may be of interest for me to state that in applying asphalt paint on a concrete surface, it has been found desirable to dissolve the asphalt in a considerable proportion of benzine or gasolene; in the latter solution the best proportion being 75 per cent of gasolene. The liquid seems to carry the particles of asphalt into the pores of the concrete, and, when it is thoroughly dry, a thicker coat of melted asphalt is applied. In this way we obtain a very perfect adhesion of the latter material.

Mr. C. D. Rinald: What Mr. Trautwine has said is true of almost all paints. Paint, for protection, should not be too heavy, as it is then much more liable to be affected by mechanical action, such as anything striking against it.

Mr. Smith: So far as the use of benzine on iron is concerned, we have found it objectionable, as it is difficult to obtain it perfectly volatile, so that when it evaporates it leaves a greasy surface, which, though not objectionable on cement or concrete, is disadvantageous upon iron.

Mr. Rinald: The use of red-lead as a priming coat to make the protective coat adhere better, recalls to my mind an amusing letter we received some time ago from a gentleman down South. He wrote that it was the custom in that part of the country to allow metal roofs to rust slightly, because the paint would then adhere better. Many builders, indeed, believe in allowing the iron to rust slightly, thinking that the protective paint, applied afterwards, will be incorporated into the iron. I do not think that this can be proved, but I do not see why a paint cannot be made — in fact, there is a paint — that will adhere to the iron without anything under it, even when the iron is very smooth. However, a priming of red-lead would certainly be better than a coat of rust.

Mr. E. A. Custer: We had that experience in connection with a couple of buildings last summer. The roofs were made of tin, the front being inclined a half-inch in 10 feet to satisfy our city building-laws. We requested the builder to paint it over with red-lead, but he replied, "We always wait until it rusts, for then the paint sticks better."

Mr. F. Schumann: Some ten years ago we allowed a man to exhibit at our works a material that he prepared for coating iron with a glossy covering of different colors, which stood the test of being immersed in water and different acids. We bought the secret from him for the composition of the material, which was simply sandrax gum dissolved in alcohol and colored by pigments. We afterwards painted a steam-engine with this mixture, which, without pigment was very transparent, so that the engine always remained clean, and prevented the iron from rusting until it was taken off, about two years after its application, at a cost of nearly $100. Why are there not some good qualities in these vegetable gums for their use in the protection of iron? It stood exposure to steam, gas and moisture.

Mr. Rinald: A similar preparation, largely used for many purposes, is gum shellac dissolved in alcohol. It makes a strong coating, but I do not think a gum will stand exposure to the weather for any length of time. It will crack and peel off.

Mr. Smith: It is, unfortunately, true of almost all vegetable gums which are completely soluble in alcohol, that while they make a good-looking appearance, they are practically worthless when exposed to the weather, and even in the better grades of varnish for wood these gums are never used for that reason.

Mr. Max Livingston: I would like to bring up the point of the comparative difficulty of protecting steel and iron. It has been my experience that paint on iron will last considerably longer than on steel, especially on the outside of steel tanks filled with water. If filled with oil, there seems to be less difficulty; but when they contain water the steel rusts very quickly. The best of paints will chip if over a steel surface, under the same atmospheric conditions where they would last on iron. I should like to know if this can be explained.

Mr. Smith: This, doubtless, is a fact; but the explanation which I must fall back upon is the somewhat lame one that some materials rust quicker than others, in the same way that some materials are more soluble in certain acids than others. Regarding bisulphate of carbon as a vehicle for paint, its fumes have a very bad effect upon workmen using it, and are probably more inflammable than the vapor of any other liquid; and I have known of cases where serious explosions occurred from paints in which it was used.

Mr. Custer: I think that if the surface of either iron or steel is perfectly clean before the paint is applied, iron will not be found to last any longer than steel, so far as rust is concerned.

Mr. Schumann: The absolute removal of scale must be insisted on. We find, instead of using acid baths for this purpose, sand-blasts are very efficient and very quick, and make the surface of the iron bright and clean. In the plan that I am familiar with, a 3×3 angle bar 20 feet long can be thoroughly cleaned with a sand-blast in about 5 minutes. It also has the advantage of being applicable to work already riveted together. I think it would be well if those preparing specifications should incorporate a clause requiring the cleaning of the iron and its subsequent inspection before any paint is applied.

Mr. C. E. Wolle: Rosin dissolved in benzine will protect iron from the effects of salt water, as we found by experiment in shipping deck-loads of this material. Regarding the rusting of tin roofs before the paint is applied, I think the tin is often exposed to the action of the atmosphere in order to allow the film of oil which covers it when manufactured to be destroyed, and the paint will then certainly adhere better.

Mr. Trautwine: In examining a piece of 6-inch water-pipe laid in about 1822, we found it incrusted inside with a layer of material that proved to be chiefly oxide of iron and graphite, so that the internal area of the pipe had been reduced about 20 per cent. Another piece of 6-inch pipe laid 26 years ago, after having been first coated with a protective paint, was examined, and practically no incrustation was found upon it.

Mr. H. J. Hartley: For the last 25 years we have never allowed iron plates to be applied on ships without first pickling them in muriatic acid, washing the acid off thoroughly, and then painting them with red-lead; so that I see nothing new in that. When the ship is ready to launch, a second coat of good red-lead and linseed oil is applied.

Mr. John L. Gill, Jr.: Chimney-stacks made of No. 14 iron are very common on the boats sailing the Ohio and Mississippi rivers, and are often painted with ordinary coal-tar containing a little lime, to neutralize any acid that might be present. Stacks coated in this way have to be renewed about every three years. The first experience I had of red-lead being used in this way was on the steamboat "*J. B. Williams*," built during the war. Two years ago I saw this boat at Pittsburgh, and it still had its original stacks, which had been protected by a coat of red-lead and linseed oil applied regularly once a year. This method of protection for smoke-stacks is one of the best that I know of. For boiler-fronts and similar purposes I know of nothing equal to Bessemer paint.

Mr. Hartley: I think a coating of linseed oil is as good as any paint for the latter purpose.

Mr. Custer: My experience has been that on the smoke-stacks of locomotives, for instance, linseed oil gums and causes considerable trouble.

Mr. Schumann: In the discussion on this subject at our meeting of four weeks ago there seemed to be a difference of opinion as to the efficiency of a cement covering to prevent corrosion of iron. I therefore took the trouble, within the last two weeks, to inquire about this among builders who had torn town old structures built with mortar cement, and some of more recent date built with cement. Their opinions differed, but the majority seemed to be in favor of cement forming a protection for iron.

Mr. H. C. Lüders: It would seem to me that the additional expense of cleaning iron in buildings would amount to almost as much as the original price of material, and if so, would it be well in the specifications to insist upon the iron being so prepared?

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MR. SCHUMANN: I think the iron could be cleaned with sand-blast at a comparatively small expense after it is placed in the structure. It would probably cost as much as handling the iron and applying the first coat of paint.

MR. CUSTER: It should not matter to the designer what the expense will be, if it is made necessary in order to have a building that is absolutely safe. Any structure that is liable to break down in a few years is not worth the material in it.

L. F. RONDINELLA, *Sec'y.*

ARCHITECTURAL LEAGUE OF NEW YORK.

AT the regular meeting of the Architectural League of New York, held December 3, 1895, there was quite a warm discussion, by the members of the Society, upon the following subject: "The Amendments to the Building-laws; the Relation of the Department to the Building-laws, and the Relation of Architects to the Building laws and the Building Department."

There was no motion passed or definite action taken, but it seemed to be the general opinion that the amendments to the laws should be made by the architects, assisted by the engineers; and that the law, as it stands to-day, applies and was made for buildings on a lot 25' x 100', not more than five stories high.

That the Department should be a department of surveillance, superintendence and the prosecution of violators of the law — and not translators of the law. The present system of translating the law before the buildings are built is but causing the public to feel that the services of an architect can be dispensed with, and that the employment of any one who can merely draw out a building for application to the Department, is all that is required.

The members of the League thought the law should be more elastic; it should specify the limit to which one could go in building, but not specify the detail of construction. In that way, leave intelligent architects and builders free to do the best possible to advance the mode of construction, the free use of new materials, and the responsibility of the owner should be put upon their shoulders. That the Department should be composed of good and capable men, able to properly inspect and intelligently substantiate the truth of any disapproval before an intelligent jury.

The Committee on the Eleventh Annual Exhibition of the League, (which will be open to the public from February 15 to March 7, 1896) reported a very interesting programme. It has been finally decided, after many years of opposition, to throw the Exhibition open to the public free, except on Tuesdays and Thursdays of each week. Many interesting features were discussed, which were referred back to the Committee, to report on at a later date.

The Committee on Competitions and Awards reported the programme for the gold and silver medal of the year, a competition for a prize offered by the President and one for a prize offered by Mr. Samuel P. Avery. Announcements for the Exhibition and the three prizes above named are expected to be distributed to the members in a few days.

SOCIETY OF BEAUX-ARTS ARCHITECTS.

THE Annual Meeting of this Society was held at the Hotel St. Denis, on Monday evening, November 15. Over thirty members were present.

The following officers and committees were elected: *President*, John M. Carrère; *Vice-President*, John Galen Howard; *Secretary*, Edgar A. Josselyn; *Treasurer*, Joseph H. McGuire; *Corresponding Secretary*, John L. Howe. Members of *Executive Committee* (besides officers *ex-officio*) Walter Cook, Ernest Flagg and S. B. P. Trowbridge. *Committee on Education*, Whitney Warren, E. L. Masqueray and Albert L. Brockway.

Four new members were elected at this meeting and a ceremony of initiation was inaugurated, which gave great entertainment and formed the chief feature of the evening's fun.

EDGAR A. JOSSELYN, *Secretary.*

VANBRUGH AND MARLBOROUGH.

THE first proprietor of Blenheim had a distressing time in completing his house; so did the architect, Vanbrugh; so did the British Parliament. Each time the architect added a pantry shelf or a peg to the Duke's clothes-closet he had to knock off work and wait till the governmental ghost walked. In other words, he could not pay up his workmen Saturday night. He was kept in a state of mind continually.

When George I ascended the throne, the workmen were glad to accept a third of their wages and call it square. At last, in 1715, the workmen all went out on a strike, and a notice was tacked to the fence that non-union men need not apply. Things had thus come to a standstill several times before. Since Blenheim was intended as a memorial monument from a grateful Government, the Duke determined not to frustrate the Government's design by making any contributions, or in any way making himself responsible for debts incurred for its building.

Once before this time, the Queen had given the architect enough change to board up the windows and doors against the ravages of the weather, and had left things long at a standstill.

The Duke had plenty of money, but he determined to board or live in a flat for the rest of his life rather than deprive the Government of one jot of happiness it might experience by building his house for him.

All kinds of things happened in connection with the building of the Duke's house. For one thing, the architect lost through it his vocation. He and the Duchess were constantly quarrelling. Every time a speaking-tube was put in, she had a criticism to make on the style of the mouth-piece, or some similar trivial thing of a sort to make an architect wish he was dead.

This kept the poor architect constantly on the verge of nervous prostration. That his life was made miserable may be judged from his correspondence. He writes:

"I have the misfortune of losing, for I now see little hope of ever getting it, near £2,000, due to me for many years' service, plague and trouble at Blenheim, which that wicked woman of Marlborough is so far from paying me that the Duke, being sued by some of the workmen for work done there, she has tried to turn the debt due to them upon me, for which I think she ought to be hanged."

How different it is to-day in the history of the Marlboroughs! The present Duchess, like the one who has just gone before her, has but to say: "Let there be electric-light," and there is electric-light.

And yet it was not for lack of funds that the primitive Duchess of Marlborough acted so; because we read that:

"The Duke of Marlborough's treasure exceeds the most extravagant guess. The grand settlement, which it was suspected her Grace had broken to pieces, stands good and hands an immense wealth to Lord Godolphin and his successors. A round million has been moving about in loans on the land tax, etc. This the treasury knew before he died, and this was exclusive of his land, his £5,000 a year upon the Post office, his mortgages upon a distressed estate, his South Sea stock, his annuities and, besides, what is in foreign banks. And yet this man could neither pay his workmen their bills nor his architect his salary.

"He has given his widow (may a Scottish ensign get her!) £10,000 a year to spoil Blenheim her own way; £12, 000 a year to keep herself clean and go to law; £2,000 a year to Lord Rialton for present maintenance, and Lord Godolphin only £5,000 a year jointure, if he outlives my lady. This last is a wretched article. The rest of the heap — for these are but snippings — goes to Lord Godolphin, and so on. She will hand £40,000 a year in present."

Thus we see that there is an advantage in having for an architect one who is a writer of brilliant comedies as well. His letters afford joyous interest to posterity.

Vanbrugh tells some interesting things about that first lady of Blenheim. He tells how he took a party, including his wife, over to look at the place, while they were waiting for the walls to settle, so that they could begin plastering. He says:

"We staid two nights in Woodstock; but there was an order to the servant, under her Grace's own hand, not to let me enter Blenheim! And lest that should not mortify me enough, she, having somehow learned that my wife was of the company, sent an express the night before we came there, with orders that if she came with the Castle Howard ladies, the servants should not suffer her to see either house, gardens, or even to enter the park; so she was forced to sit all day long and keep me company at the inn."

Imagine the bell-boys of that English inn bringing up ice-water all the afternoon under these conditions to Vanbrugh and his wife.

The Duchess whittled her enmity to a fine point in 1735, and Vanbrugh tells of its prick thus:

"I have been forced into chancery by that B. B. B. the Duchess of Marlborough, where she has got an injunction upon me by her friend, the late good Chancellor [Earl of Macclesfield], who declared that I was never employed by the Duke, and therefore had no demand upon his estate for my services at Blenheim.

"Since my hands were thus tied up from trying by law to recover my arrear, I have prevailed with Sir Robert Walpole to help me in a scheme which I proposed to him, by which I got my money in spite of the hussy's teeth. My carrying this point enrages her much, and the more because it is of considerable weight in my small fortune, which she has heartily endeavored so to destroy as to throw me into an English bastile, there to finish my days, as I began them in a French one."

Unhappy Vanbrugh! — *N. Y. Times.*

THE ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

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[Gelatine Print issued with the International and Imperial Editions only.]

A DESIGN FOR THE MINNESOTA STATE CAPITOL, SUBMITTED IN THE SECOND COMPETITION. MR. ERNEST FLAGG, ARCHITECT, NEW YORK, N. Y.

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ELEVATIONS AND SECTIONS OF THE SAME.

PLANS OF THE SAME.

[Additional Illustrations in the International Edition.]

VILLA OF M. LE COMTE DE B——, RADE DES BORDES, AUDE, FRANCE. M. HENRI VALETTE, ARCHITECT.

[Copper-plate Photogravure.]

ANOTHER VIEW AND PLAN OF THE SAME.

[Copper-plate Photogravure.]

CITY ASSEMBLY ROOMS FOR MESSRS. DRAYSEY BROS., BIRMINGHAM, ENG. MESSRS. ESSEX, NICOL & GOODMAN, ARCHITECTS.

NO. 18 GREAT MARLBOROUGH ST., LONDON, ENG. MR. PERCY STONE, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A QUESTION OF COMMISSION.

St. Louis, Mo., December 7, 1895.

To the Editors of the American Architect:—

Dear Sirs,— Will you kindly answer the following question which has arisen between myself and a client, whose house I am just finishing.

In my specification for his work, the sum of $200 was allowed for a filter, and among the items which I mentioned in the specifications as not being included in the contract, but which would be necessary to the full completion of the house, were the art glass windows.

My client took the matter of the filter out of the general contractor's hands, and let the contract himself for a more expensive apparatus, and aside from seeing that the necessary water connections were made to it, I have not been asked to attend to it in any way.

The art glasswork, which I have heretofore always had in my charge, in this case was given to the decorators by the owner, and aside from furnishing blue-prints and correct measurements for these windows, I have had nothing to do with them.

I claim that my 5 per cent commission on the total cost of the house should include the filter and art glass, as "fixtures considered necessary by the owner to render his house fit for occupancy." He thinks, as I had nothing whatever to do with them, I should not demand a commission on their cost.

Not wishing to appear unreasonable, I will ask you to please answer this question through the pages of your paper — whether I am justly entitled to the commission or not?

Very truly yours, W. Albert Swasey.

[There is no reason whatever why your client should not pay commission on the intended cost of the filter. Unless the contract expressly provides otherwise, the builder is legally entitled to retain his profit, of twenty or twenty-five per cent, on the price of anything omitted from the contract, to compensate him for the trouble of estimating it in the contract price; and it would be strange if the architect could not collect his five per cent for taking a great deal more trouble in regard to it. As to the art glass, as the architect must study, in making his designs, the effect of the glass in modifying the light and color of the rooms in which it is placed, and must arrange his plans so as to give it a position where it can be well seen, and suitably illuminated, all of which requires very considerable time and skill, it is always customary, so far as we know, to allow him his five per cent commission on its cost, in any case, and a good deal more if he designs or selects it. — Eds. American Architect.]

EXHIBITIONS

Atlanta, Ga. — *Cotton States and International Exposition:* September 18 to December 31.

Boston, Mass. — *Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St.

Paintings by Wilton Lockwood: at the St. Botolph Club, December 2 to 14.

Ninth Exhibition of Water Color Club: at J. Eastman Chase's Gallery, 346 Boylston St., December 6 to 18.

Pictures by William Adam: at the Boston Art Club, December 16 to 23.

Water-color Exhibition: at the Unity Art Club, 711 Boylston St., December 10 to 24.

Water-colors by Walter L. Chaloner: at the Bostoniana Club, 83 Newbury St, December 12 to 17.

Chicago, Ill. — *Paintings by Glasgow and Danish Artists:* at the Art Institute, November 19 to December 22.

Paintings by the Chicago Palette Club and Chicago Art Students League: at the Art Institute, December 12 to 29.

New York, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South, opened November 28.

Drawings by George du Maurier: at Wunderlich & Co.'s Gallery, 868 Broadway, November 23 to December 21.

Pictures by Walter L. Palmer: at the Avery Galleries, 368 Fifth Ave., December 2 to 14.

Pictures by Victor Pierre Huguet: at the Durand-Ruel Galleries, 389 Fifth Ave., December 10 to 18.

Philadelphia, Pa. — *Autumn Exhibition of the Philadelphia Art Club:* opened November 18.

Sixty-fifth Annual Exhibition of the Pennsylvania Academy of Fine Arts: opens December 23, closes February 22. The Architectural Section of the Exhibition closes February 1.

Thomas Hovenden's "Breaking Home Ties": at 904 Chestnut St.

Springfield, Mass. — *First Annual Exhibition of Society of Springfield Artists:* at Rude's Gallery, December 4 to 25.

NOTES AND CLIPPINGS

Storage Batteries. — Storage batteries have at last reached the place in the electrical arts to which their peculiar advantages have long entitled them; but the road of progress has been strewn with disastrous failures, blighted hopes and wrecked fortunes to an unimaginable degree. They have now certainly "arrived," and the production is already large. One factory alone in Germany turns out fifty tons a day, while there is every indication that the figure will be largely exceeded in this country. The amount of ingenuity bestowed on this vexatious appliance in the period when it may be said to have been sowing its wild oats was large, but improvement was still going on. A recent innovation of importance has been to admix granulated pumice-stone with the lead from which the storage-plates are to be moulded. Heat expands the air in the pores of the pumice-stone, and thus an infinite number of cells are formed throughout the mass of lead. The porosity thus obtained is so great that a plate 9″ x 7½″ will absorb 5½ ounces of water. The pumice-stone can be removed at will, but as it is electrically inert, and there is only ten per cent of solid matter, its presence is of little account. Obviously a great range is available in both the elements of weight and porosity. It is expected that the use of this spongy substance may permit a return to the earlier and simpler Planté type of cell, which has of late disappeared before the Faure type, in which the "active material" has to be mechanically applied to the plate. The new cell has evidently a very large natural surface of "active material," whether its plates be thick or thin, while it is held with absolute security in the innumerable pores and pockets of the body of the plate. — *N. Y. Evening Post.*

An Abandoned Tunnel as a Wine-cellar. — The most expensive and extensive wine-cellar in the world is owned by the Roumanian Government, which, very much against its will, has become the proprietor of this realty. A railroad tunnel situated between Galatz and Barbosh could not be used for railroad purposes because of its inferior construction. Piercing a mountain in which clay, loam and conglomerates are the principal geological constituents, many cave-ins, slides and other accidents have occurred within the tunnel. It is almost 2,600 feet long, and its cost was near 4,000,000 francs. Since it could not be used for the railroad, the tunnel was leased to a wine dealer, who has turned it into an immense and excellent wine-cellar, for which he now pays an annual rental of 6,000 francs. He has placed 4,000 large barrels of wine within the tunnel, and claims that the storing of wine in this cellar considerably adds to its excellence. There is no other wine-cellar in the world which has cost as much. — *Boston Transcript.*

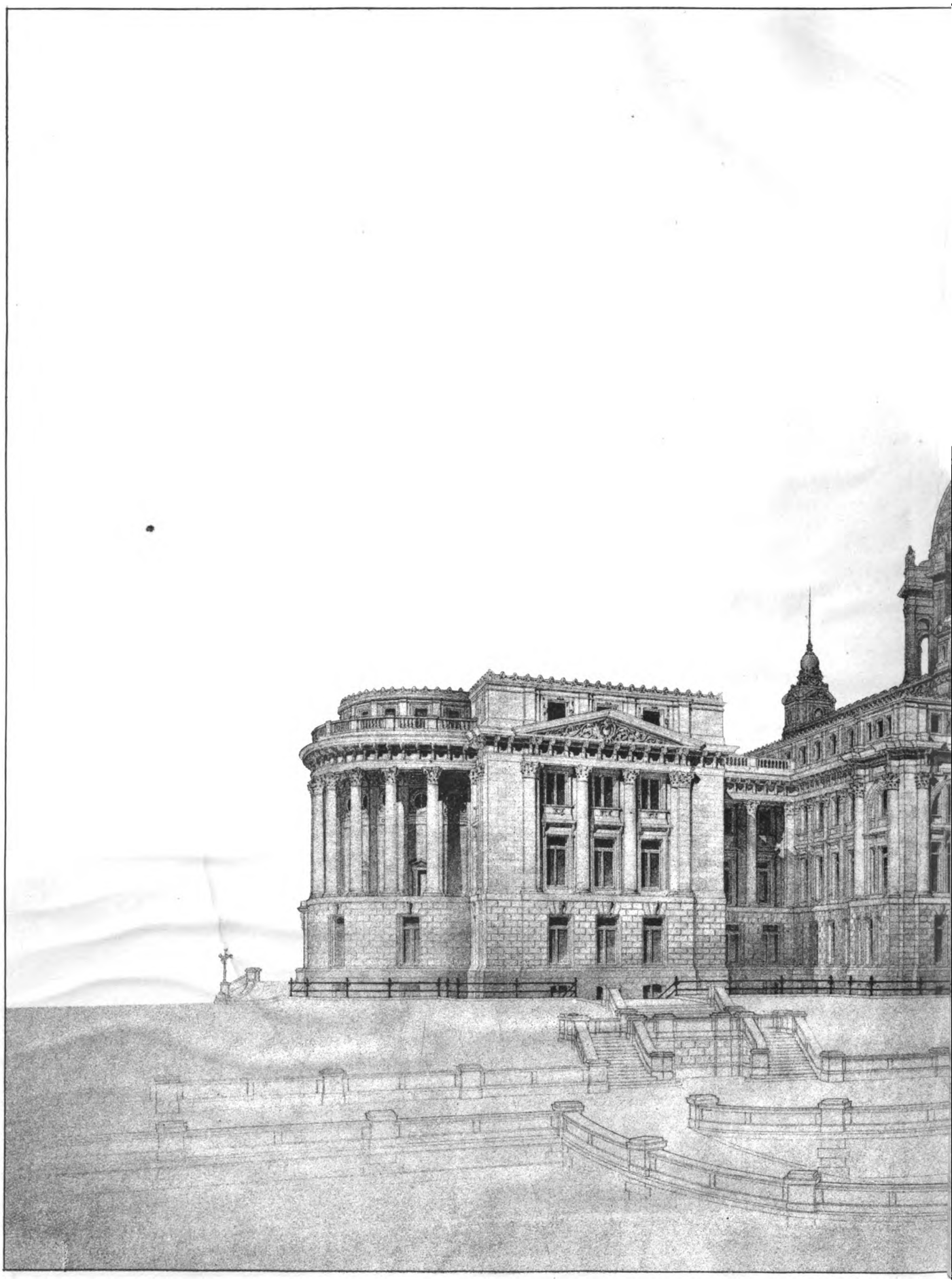
Fort Raleigh, Va. — The work of restoring Fort Raleigh, which was built on Roanoke Island by Sir Walter Raleigh's colonists, will begin immediately. It is one of the most historic spots in the United States. In the restoration, permanent materials will be used, and the fort will present, as nearly as possible, the appearance it did over three centuries ago. The work of restoration will be done by an association whose members are mainly in North Carolina and Maryland. — *Boston Transcript.*

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DESIGN FOR THE MINNESOTA STATE-HOUS

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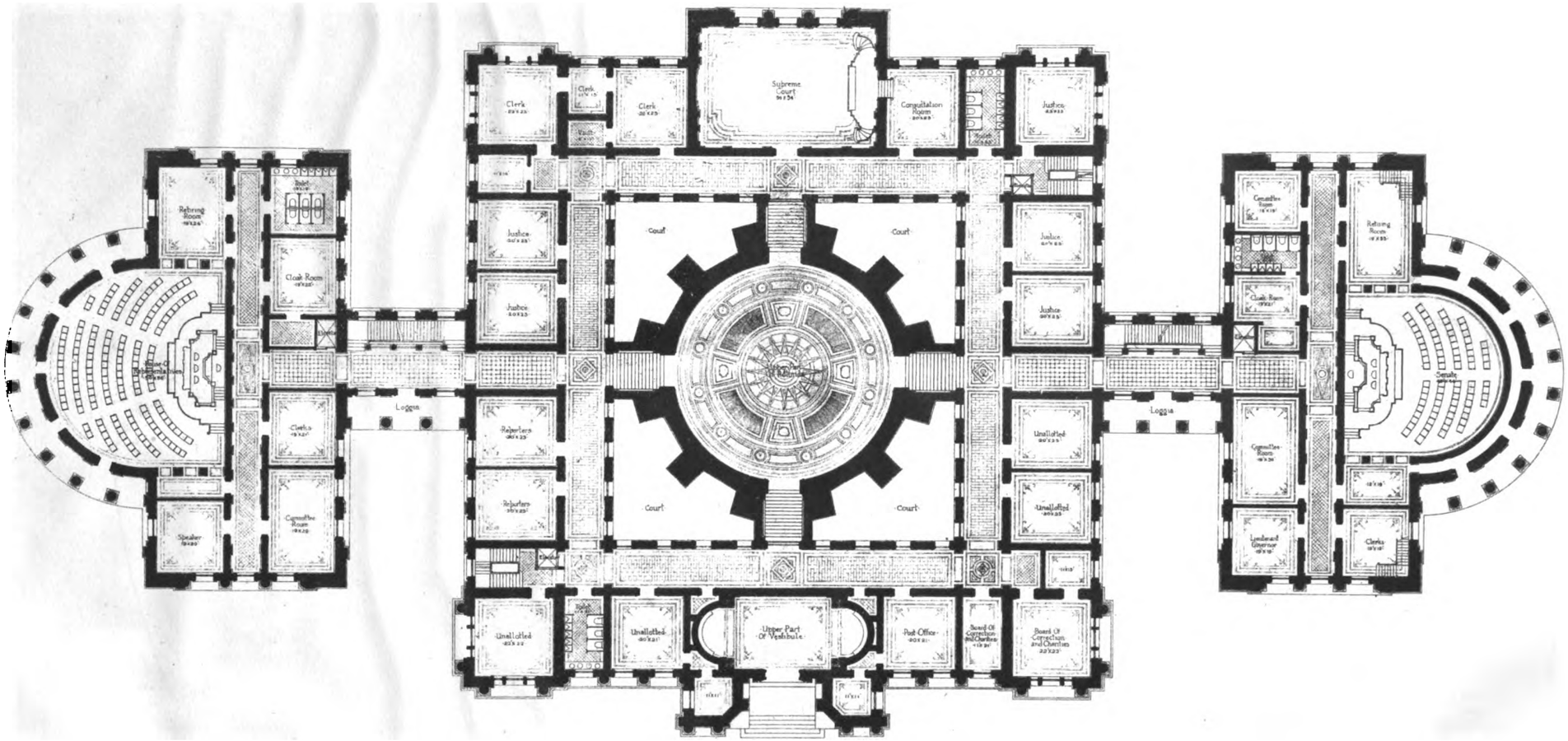
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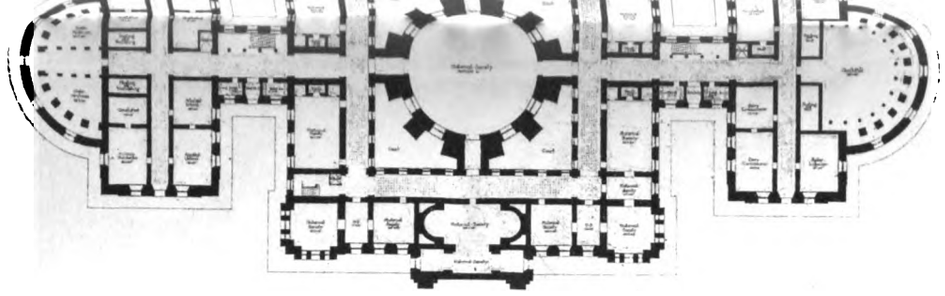
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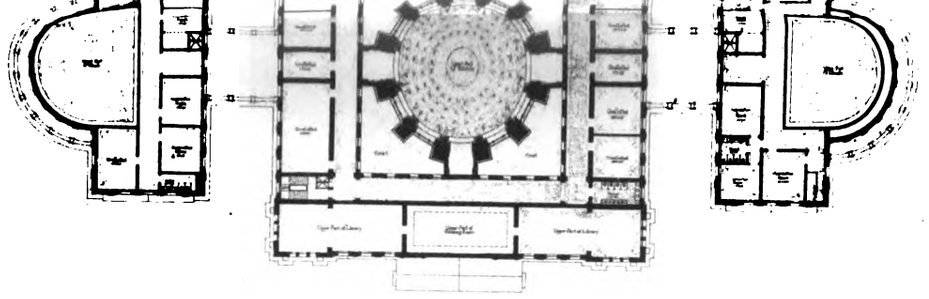
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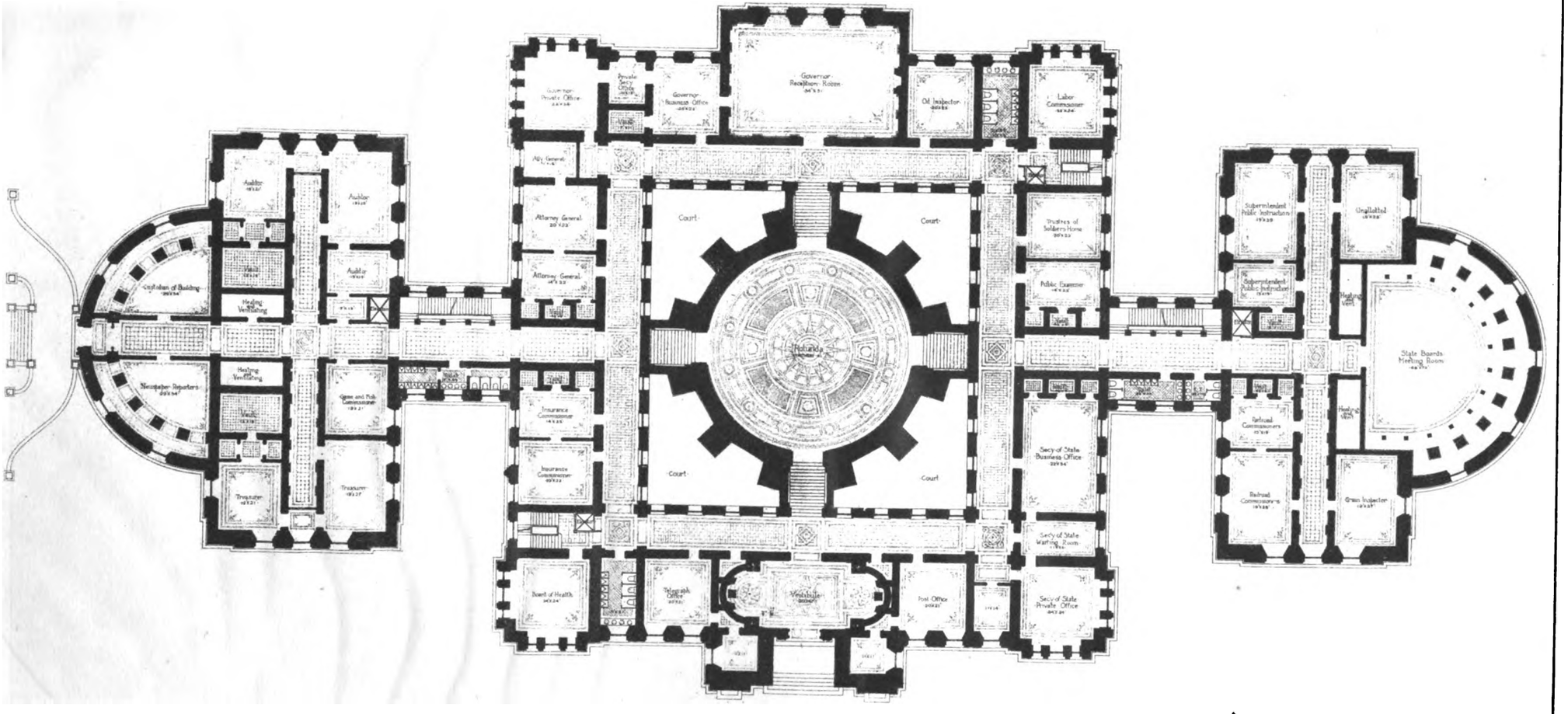
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BASEMENT.



THIRD FLOOR.



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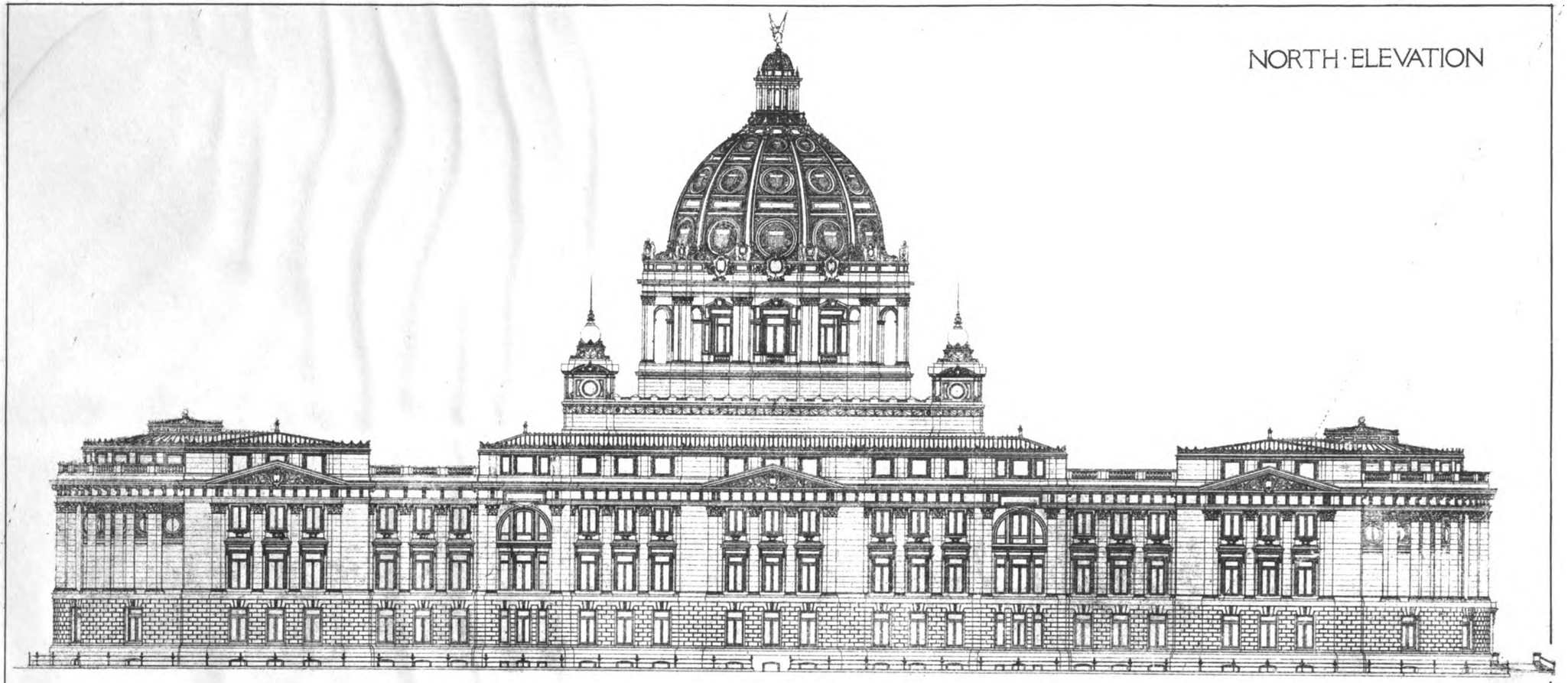
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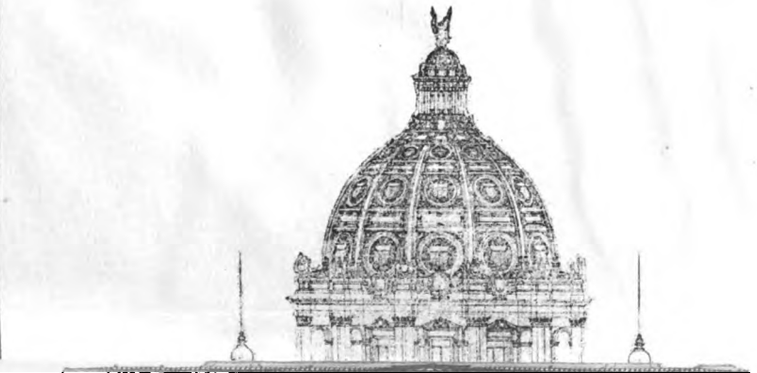
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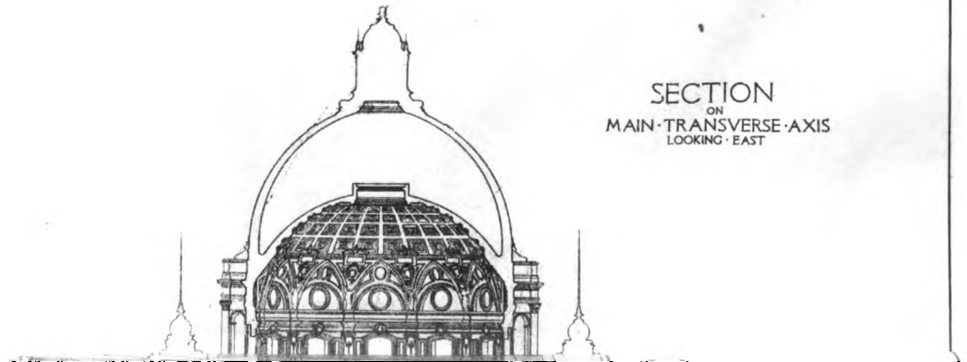
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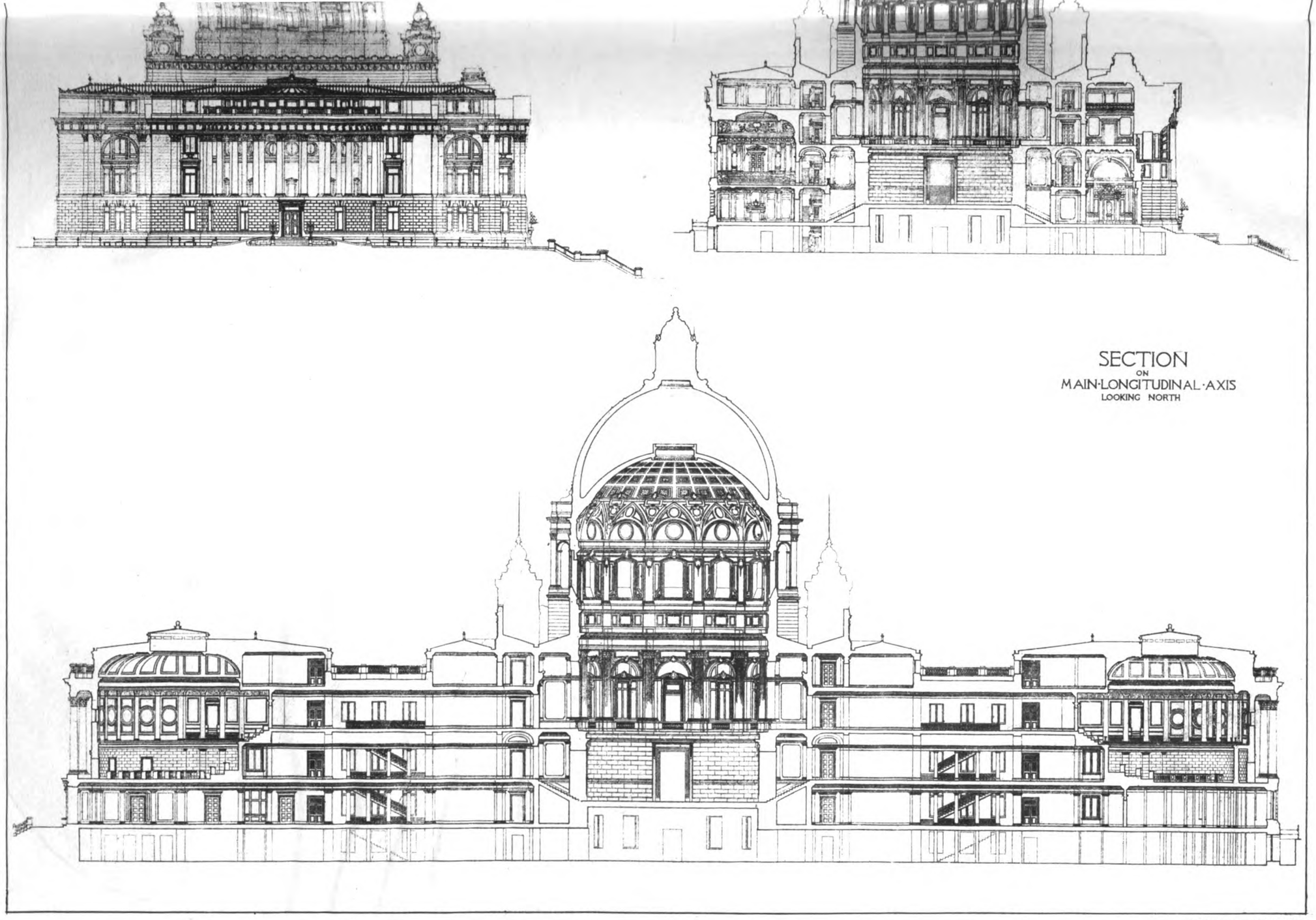




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DESIGN FOR THE MINNESOTA STATE-HOUSE, SUBMITTED IN THE SECOND COMPETITION.

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THE labor troubles in the building-trades have been somewhat assuaged by the unconditional surrender of the housesmiths, who, finding that their late employers were rapidly filling up their shops with competent new men, were only too happy to have the Board of Walking Delegates of the Central Labor Union intervene, and declare the strike off, in time for the best of them to get back into their original places, on the same terms that prevailed at the time of the strike. The principal employers of such labor, the Cornells, and Milliken Brothers, seem to have acted very considerately toward their old men, as well as fairly toward their new ones, retaining all of the latter who were competent workmen, and taking back such of the former as they still had places for. It is understood that Leary, who incited and directed the strike on the part of the housesmiths, obstinately refused to order its termination, and that the Board of Walking Delegates declared it off against his wish, and in virtue of their paramount authority. Just as the housesmiths concluded to go back to work, about a thousand stone-masons, not connected, as it appears, with the Central Labor Union, struck, as is asserted, to enforce the compliance of the masters with an agreement by which the latter promised for the present year to pay their men three dollars a day for eight hours' work. The strike was soon over, the masters, it is said, yielding at once.

PROFESSOR S. H. WOODBRIDGE, of the Massachusetts Institute of Technology, whose reputation as a designer of heating and ventilating apparatus is familiar to our readers, was recently asked, after the queer fashion prevalent among the authorities of counties and small cities, to furnish a bond, in the sum of three thousand dollars, that the heating and ventilating apparatus designed by him for a school-house in the City of Holyoke would "fulfil the requirements of the State law, and warm the building in zero weather to 70 degrees"; and, in his letter declining to accede to the request, made some extremely judicious observations. After pointing out the difference between a contractor, who undertakes to do a definite piece of work, at a definite price, and may, without impropriety, be required to give security for the fulfilment of his agreement, and the professional man, who is engaged to devote his time and skill to devising a plan for meeting certain known, and various unknown, contingencies, and who obtains employment on account of his experience and skill, he suggests that, if the designing engineer is required to furnish bonds that the apparatus designed by him will heat the proposed building to a given degree, the owners ought, in return, to warrant to him, under bonds, that the building will be as well-constructed, and tight against currents of air, as those buildings on which his calculations have been based, or, in other words, that it "shall be so constructed as to come up to some fixed and reasonable standard of tightness and air-leakage."

THIS is certainly a reasonable argument; and Professor Woodbridge enforces it by showing, as we have so often done in similar instances, that the effect of putting engineers and architects under bonds is simply and solely to increase the cost of the work. If, by any chance, a competent and self-respecting professional man should be willing to give such a bond, he will do so only when he is assured that the price to be paid for the work is large enough to cover amply the risk that he runs; but, in the vast majority of cases, the requirement of a bond simply repels all skilful and responsible professional advisers, and throws the work into the hands of reckless, ignorant and dishonest persons, who are willing to sign anything for the sake of obtaining employment; and, as a corollary, are willing to do anything to escape from their engagements or fill their pockets. It is, therefore, as Professor Woodbridge says, "wholly incompatible with an engineer's best service toward his clients to put him under bonds to furnish, at his own cost, whatever beyond his plans and specifications might be found needed for the satisfactory completion of his undertaking." "The city," he goes on to say, "cannot escape the obligation of paying for what it acquires. Its utmost claim can be only for the increased cost to which, by the engineer's error, it is put in obtaining that which it finally possesses; and the equity of even such a claim upon an engineer chosen for his skill and integrity may be reasonably questioned." In these latter clauses, which apply to architects even more than to engineers, for the reason that engineers often take contracts for the execution of their designs, and their professional responsibility may sometimes be complicated by a suggestion of a contractor's responsibility, while the strictly professional standing of architects would admit of no question whatever, Professor Woodbridge states the law, as it is now laid down by the Courts of all our civilized States, with admirable clearness.

THE first of the State Associations of Master Builders, the formation of which was suggested last year at the Convention of the National Association, in Baltimore, held its first annual convention in New York last week. Thirty-five delegates were sent by the local associations of New York City, Brooklyn, Buffalo, Rochester, Utica, Batavia and Little Falls; and communications were received from several other cities, where local exchanges do not yet exist. Mr. John L. Hamilton, of New York, acted as temporary President, and Mr. J. C. Almendinger, of Buffalo, as temporary Secretary. The President of the New York Board of Aldermen, Mr. John J. Jeroloman, addressed the Convention in behalf of the Mayor, and a constitution and by-laws, after the models proposed by the National Association, were adopted.

THE Trustees of the Metropolitan Museum of Art have declined the bequest made by the late Mr. Renwick of ninety out of his collection of about three hundred and fifty pictures. The matter was referred by the Trustees to their Committee on Paintings, and it was in accordance with their report that the gift was declined. No reasons have publicly been given for this action, but it is commonly presumed in New York that the committee, of which Mr. S. P. Avery is chairman, assisted in their examination by several experts, came to the conclusion that the genuineness of the pictures attributed to the old masters was too doubtful to make it advisable to give the collection the important place in the Museum that the terms of the bequest required. No one can doubt Mr. Avery's competence in matters relating to paintings, and the Trustees undoubtedly had excellent expert advice, so that the decision will probably meet with the approval of the public; but it is something of a disappointment to think that the Museum is not, after all, to have the Murillos and Correggios and Titians and Paul Veroneses that Mr. Renwick thought he was bequeathing to it.

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THE incident of the Heine monument in New York has passed off, the owners having withdrawn their offer to present it to the city. It is understood that they have received several requests from other cities to be allowed to furnish a site for it; so that the public may, after all, be able to judge whether Herr Herter's work was rightly or wrongly condemned by the jury of the Sculpture Society. This jury, by the way, instead of being made up of rival sculptors, as Mr. Alexander Doyle seemed to suppose, was, as we are told, constituted partly of sculptors, partly of painters, and partly of architects; so that there could hardly have been any personal feeling in the decision.

EVERY one who has seen the splendid light of the Welsbach gas-burner must look forward with anxious anticipation to the time when it will be applied to street-lighting. Apparently, that time is near. Already, two French engineers, MM. Borias and Dutertre, have constructed a street-lantern for incandescent gas-burners, which is described in the *Revue Industrielle*, and appears to be simple and practicable. The principal difficulty in using the incandescent burners is found in the fragility of the mantle, which, after the cotton fibres are burnt out of it, consists virtually of an ashy skeleton, easily shaken to pieces. In private use, this catastrophe is quite common, but MM. Borias and Dutertre arrange the mantle in their lamp so that the wind cannot reach it, and the lamp-lighter cannot touch it with his torch, the flame for lighting it being conveyed by a secondary flame, or "leader," as our gas-fitters would call it. The torch is pushed against a movable plate, which opens a valve, and turns on the gas in the leader, so that it can be lighted. A further push directs the leader flame to the jet of the incandescent burner, and turns the gas on the latter; and, finally, the plate continuing to revolve, the leader is shut off, and the main jet left burning.

AMONG the new mining enterprises which have come recently into existence, several have taken for their object the metal thorium, which, a few years ago, was simply a chemical curiosity, like cerium, lanthanum, zirconium and other substances of the same class. Within the last few years, however, the introduction of the Welsbach and other lights, depending for their power on the incandescence of a "mantle" of infusible earthy substance, heated in a gas-flame, has led to the investigation of the comparative value of different substances for giving out light, when heated to the temperature of the Welsbach flame. These investigations have shown that the oxide of thorium, used as a mantle, gives out more light than any other of the earths, the radiation being more than double that obtained from zirconium, which was once considered the best material for the purpose. As a substance capable of doubling the brilliancy of the original Welsbach burner, without increasing the consumption of gas, is evidently valuable, a search has been made for the ores of thorium in this country, as well as Europe; and considerable quantities have been found here of monazite, which is a phosphate of thorium, mixed with cerium, lanthanum and didymium. Unfortunately, it is difficult to separate these metals, so that the extraction of thorium from the American ore is an expensive process. In Norway, on the other hand, especially on the southern coast, are found veins of thorite and orangite, both of which are very rich in thorium, the former containing about fifty-eight per cent of thorium, mixed with iron, lime, manganese, and so on; while the latter is a nearly pure hydrate of thorium, containing seventy-five per cent of the metal. The demand for thorium for the Welsbach burners is already so great that the orangite ore has been sold in Norway for forty-five dollars a pound and, even at that price, it is cheaper to use than the American ore. It seems however, according to *Le Génie Civil*, that the first sales of orangite created a profound sensation on the Norway coast. For many years, this district has exported large quantities of feldspar, probably for use in making porcelain. In getting the feldspar out of the veins in which it lies, pieces of orangite and thorite are often found, and have been hitherto cast aside as useless, so that, as the inhabitants discovered, they had been dumping on the waste-heap a substance worth forty-five dollars a pound. A rush took place for the refuse piles about the feldspar quarries, and the thorite and orangite, or what the natives took to be those substances, were soon in process of separation. At the same time, the richer and more enterprising inhabitants began searching for veins which could be profitably worked for thorium ores alone. While the men were prospecting and blasting for new deposits, the women and children devoted themselves to picking over the rubbish piles, with such success that within a few months of the present year nearly seven thousand pounds of thorium ores have been exported from this small district. Now, however, troubles have arisen. The Germans, who have a fine eye for a speculation, soon made their appearance at the new mines, and some of them succeeded in making contracts with the local mine-owners, under which they advanced the money for carrying on operations, on condition of receiving all the product at an agreed price. The Norwegian rustics, notwithstanding their honest intentions, did not always know just how thorite and orangite ought to look, and their German friends knew still less about them; so that, as it turned out, shipments were made to the German speculators of considerable quantities of quartz, and other minerals, containing no trace whatever of thorium. The speculators, on discovering the nature of these "ores," were not only disgusted, but angry, and several suits at law for damages are now hanging over the heads of the unfortunate Norwegians. Moreover, when the Government heard of these valuable discoveries, it sent engineers, who inspected the workings, and then announced that as thorium was a valuable metal, like gold and silver, the mines producing it were, like gold and silver mines, legally the property of the Government, and could only be worked by private individuals on such terms as the Government might impose. A protest was made against this view, the natives contending that as the ore of thorium was used for producing the oxide only, the metallic base being of no value in the arts, a thorium mine should be regarded like a coal-mine, or like the feldspar mines which had long been worked in the district, as being exempt from the operation of a law intended to apply only to mines of gold and silver. Each side of the matter found advocates among scientific men, and the question is still before Parliament; but, meanwhile, the mines have been taken possession of by the Government officials, and "claims" of all sorts are being recorded, and quarrelled over, just as in a gold-mining region. If the application of the royalty law to the mines is upheld, the owners of the land will have just reason to grieve; and if it is abandoned, a host of people who have acquired rights in the mines under the law will suffer heavy loss.

THE eleventh Annual Exhibition of the New York Architectural League opens on Saturday, February 15, 1896, and continues until March 7. Works intended for exhibition will be collected in Philadelphia and Boston on Saturday and Monday, February 1 and 3; in Brooklyn on the two following days, and in New York City on February 5 and 6. Drawings properly entered will be collected and returned in these cities, free of charge to exhibitors. This year the novel plan for League exhibitions has been adopted of making no charge for admission, except on Tuesdays and Thursdays, when fifty cents will be charged.

AN extraordinary accident took place in Paris recently. Every one knows the Montparnasse Station, from which trains start for Brest, for Chartres, Bordeaux and many other places. The station fronts on a wide street, the Boulevard Montparnasse, opposite the Rue de Rennes, which joins the Boulevard by an open, triangular space. As the railway tracks in that part of Paris are all elevated above the streets, the station platforms are about thirty feet higher than the pavement of the Boulevard Montparnasse. A locomotive, attached to an inward-bound train, became unmanageable, just before it reached Paris. The brakes refused to act, and the whole train dashed at full speed into the station, flew along the station tracks, tore away the posts at the end of the tracks, and plunged across the platform, through the front wall of the building, across a balcony and into the street. Fortunately the passenger cars broke loose just before they reached the wall of the building; but the locomotive, followed by the tender, dived into the street. As it happened, there were few people in the street at the time, and no one was hurt except a little girl who was selling newspapers, and who was crushed by the falling mass.

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A CHURCHYARD OF PALACES.

GERMANY has been too often and too thoroughly devastated by war to afford such surprises to the artist-tourist as do the more fortunate and richer countries of the South. But even Germany has its undiscovered treasures of old art, and even German by-ways their marvels.

In the giant mountains of North Germany, in the province of Silesia, whose history is generally summed up to foreigners in the fact that Frederick the Great wrested it from Maria Theresa, there lies a group of towns whose names all end in "berg": Löwenberg, Schmiedeberg and Hirschberg. The railway trains that carry native excursionists into the heart of the mountains, pass through the towns, which lie on open plains at the valley mouth. All three places are market-towns and all three have "rings," or old market-places, surrounded by patrician houses, the ground-floors of which are open and arched. You walk about the spot under these clumsy arcades, and step almost at every stride upon some of the wares of the merchants that occupy them. And if you purchase something for a souvenir, you carry the thing first to the light, in order to be sure what it is: for permanent twilight reigns under the picturesque old stone arcades. The middle of the "ring" is the site of the church-like town-hall, whose shadow is cast aslant the cobble-paved open square and adds a double darkness to one side.

In former times, you think, the towns must have been flourishing communities, for the architecture of the public and private buildings is uncommonly rich. And this impression grows the more one investigates; everywhere in Schmiedeberg and Löwenberg are bits of rich stucco, and carving, and fine ironwork. In Hirschberg, the largest of the three towns, remains of a mighty town wall, sumptuous interiors in private houses, a Catholic church overladen with sculptures, and a mighty domed Protestant church, are found; and — what is spoken of in no art-work and what no inhabitant has ever thought of mentioning — a churchyard walled-in by palatial tombs!

For one, I shall never forget the excitement that electrified me as I strolled into the large space from the street, and made the discovery. I had been in the town half a dozen times, but this time I remained in it. It seemed to me that the wrought-iron doors of these marble and stucco tombs were well worthy of being studied and published.

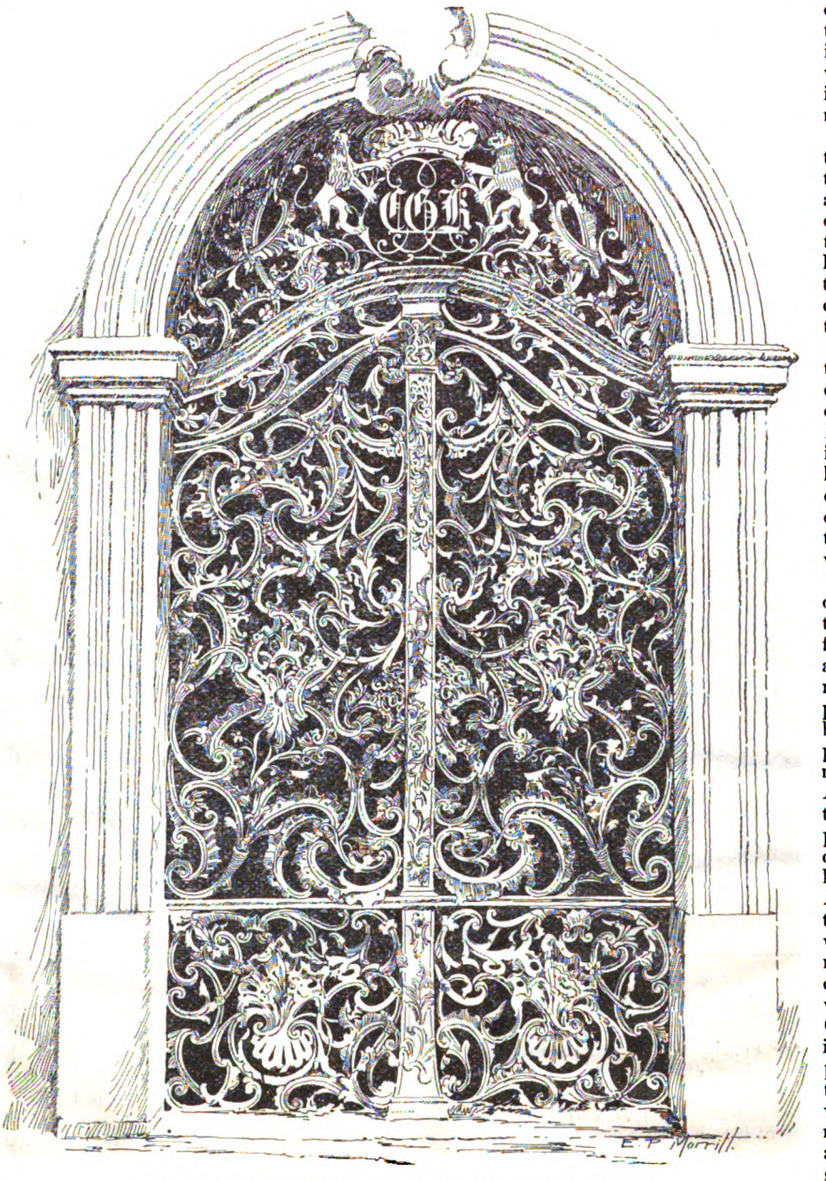


Fig. 5. Grille to Tomb of the Merchant Kosche, Hirschberg, Silesia.

Through the kindness of a professor in the local *Gymnasium*, the little literature that exists about the history of the town was put into my hands; a few of the finest tombs were photographed; and the meagre details known to the families possessing the tombs, respecting their age, their designers, and so forth, were collected and transcribed. Very few original manuscripts remain, for the town has been burned repeatedly and its old families ruined and dispersed.

It appeared, however, that the date of the earliest tomb must be 1709, that being the year when the Gnaden Kirche was built, around whose precincts is the wall against which the tombs are constructed. The latest tomb is supposed to be a hundred years old,[1] and that, as it seems to me, for a very good reason. For Hirschberg, as it ought to interest us Americans to know, was the centre of the flourishing manufacture of the cotton and linen material known as *Schleier* (veiling), and the thicker material known briefly to dressmakers as "silesia." A great number of looms were kept busy and the value of the export of goods to America alone amounted to hundreds of thousands of thalers yearly. Hirschberg manufacturers became millionaires. By the middle of the sixteenth century their wealth and luxury were such as to astonish even such a man as King Frederick, a prince who had seen the luxury of the munificent Augustus of Saxony and the wasteful courts of his fellow-sovereigns. Happening to be in Hirschberg on his little private business of pocketing the province, as an old chronicler relates, he gazed out of the windows of the mansion which the town-elders had placed at his disposal, and seeing marble and sculptures glisten through the foliage over the street, he asked of a citizen, "What are those palaces, and to whom do they belong?"

"Ah! Majesty," was the response, "those are not palaces; they are tombs." "Tombs!" cried the monarch, with a great oath of wonderment. "And *you* can afford handsomer tombs to bury your dead in than I can afford walls to house myself in! Reckon on paying a million more indemnity."

And two hundred thousand thalers more they had to pay; though, as they declared in one of their many protests, the troops of his Majesty had devoured already their last loaf, and his officers had collected their last pence.

But Frederick took the results of their labors only. He left them the cause of their wealth. In the long run he even increased it, for the public highways which he ordered built in the captured province facilitated transportation while reducing its cost.

The blight that rests on the industry of the town to the present day fell on it through an act of a foreign ruler, namely, Napoleon Bonaparte. His edicts of embargo stopped the exportation of the goods manufactured for the American market, while the wars he carried on prevented the finding or opening-up of home markets to replace them. And before the prostration that followed these wars had ceased, the new inventions of machinery that had meanwhile been made in Great Britain and America had triumphantly displaced the hand-looms of the valley. Hirschberg veiling was heard of no more, and, one after another, its merchants gave up manufacturing it, broken in fortune and hope.

This commercial catastrophe in the heart of the great mountains does not concern us, however, any more than the political fate of the Italian republics of the Renaissance. What is of interest to artists is the odd direction which the love of display of the Hirschberg merchants took so long as they had means; and the fashion they set. For surely in this their peculiar passion for surpassing their neighbors in the magnificence of their family tombs, this obscure Hirschberger patriarchy outdid all others in Germany; or can another example like the Gnadenkirchhof be pointed to? I have never seen or read of its like. Nor could it be accounted for, to my mind, save by the fact that Silesia lies alongside Bohemia, a Roman Catholic country, in which the Jesuits have developed much pompousness of church decoration. The wealth of the Hirschberg patricians might have been never so great, it would hardly, I think, have been expended in chapel-like tombs around a church, unless

[1] An exception should, perhaps, be made in the case of the Hess tomb, which a member of the family told me was built by her grandfather, who was still alive in 1868. Thus it may be that the time I set for the age of the latest tomb is incorrect. In such places, tradition and example hold sway longer than we think.

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similar chapels had impressed their imagination and incited their emulation. For be it observed, the tombs, various as they are in style, are similar in their general construction, and this construction resembles that of the side-chapels of Catholic churches. Their counterparts are legion, to mention only one or two of the most famous: St. Wenzel's chapel in the Cathedral of St. Veit, in Prague, and the Czernin chapel in the same church.

Every great family of Catholic lands, in fact, has somewhere in some church its own chapel. Up to within modern days it served as a burial place for the members of the family. The altar was consecrated to a saint; the pavement of the sacred precinct to the bodies of the founder's kin, forever.

Now when the Hirschbergers turned Protestant and contributed money to build a Protestant temple of worship, this traditionary duty of families who could afford it, of building burial chapels, was still cherished; and formerly, it would have been within the church itself that they would have erected their chapels. But not only their Protestant abhorrence of founding altars to saints prevented them; a law of the land prohibited the interment of the bodies of laymen within church walls.

So outside they had to go and build their family tombs amongst the vulgar multitude of the dead; but in every other particular, save that of situation, their funereal chapels were made as like those of the greatest magnates as could be — like them in appearance, at least. Not in every case are they really like their rivals in the old



Fig. 6. Grille to Tomb of the Merchant Kunze, Hirschberg, Silesia.

cathedrals, for the latter are nearly all faced and adorned with marble, while most of the Hirschberg chapel-tombs are of stone, and a few are of common brick covered with stucco. But the richest of them, it is true, are likewise of marble. The sculptures, also, that adorn several in profusion, are of this imported costly material, and it is impossible to describe what a quaint, delightful note the native rudely-made red roof-tiles strikes in the picture; like a bit of honest dialect in artificial diction. I give an example in Figure 1, [See Illustrations] which is the tomb of the family von Schweinichen — the same family to which the jolly boon companion of the jolly Duke Frederick of Liegnitz belonged. Every reader of Freytag's "*Pictures from the German Past*," will remember von Schweinichen, the German Pepys and Greville combined, and will be as glad as I was to find his family tomb so precisely like himself: baroque and pompous, with an amusing and winning mixture of natural rusticity.

A few of the sculptures are said by common report to be the work of Canova and his pupils; several tombs — and this seems more probable — are attributed to E. Pettrich of Dresden, and Gottfried Schadow. Some earnest, patient and learned student will turn up on the spot some day and unravel these reports, as well as the mystery that envelops the whole origin and history of the tomb-doors.

These, almost without exception, are of wrought-iron, and compose the most artistic and precious element of the tombs. Yet not the name of the maker of a single grille is known. All that the family papers of the owner of the tomb shown in Figure 11 unfold, are the facts that the doors were wrought in Löwenberg, and cost twelve hundred dollars.

So Löwenberg, the second little town in the neighborhood, was the birthplace of these iron marvels! Iron of finest quality was formerly mined in Schmiedeberg, and to this day, when an old house is torn down in either Löwenberg or Schmiedeberg, people flock together to bid for its nails, hinges and other metal-work, because the old hardware is so good. And the reason why the smelting-works have disappeared from the two towns, where they used to be, is because the forests round about have been consumed: the ore goes farther, into Upper Silesia, where coal is found and may be used in place of timber in the smelting-furnaces.

But even after hearing these facts, which explain why workers in iron should have established themselves round about Hirschberg, the query is not answered, How did such artistic and elaborate designs happen to come out of their workshops? I think the most likely explanation is, that the masters of the smithies and their apprentices had travelled, as was the custom of the time, and were acquainted with the Augsburg prints, or some of the numerous books of patterns that were published in rivalry of those celebrated prints.

The examples of the wrought-iron portals which I am able to give

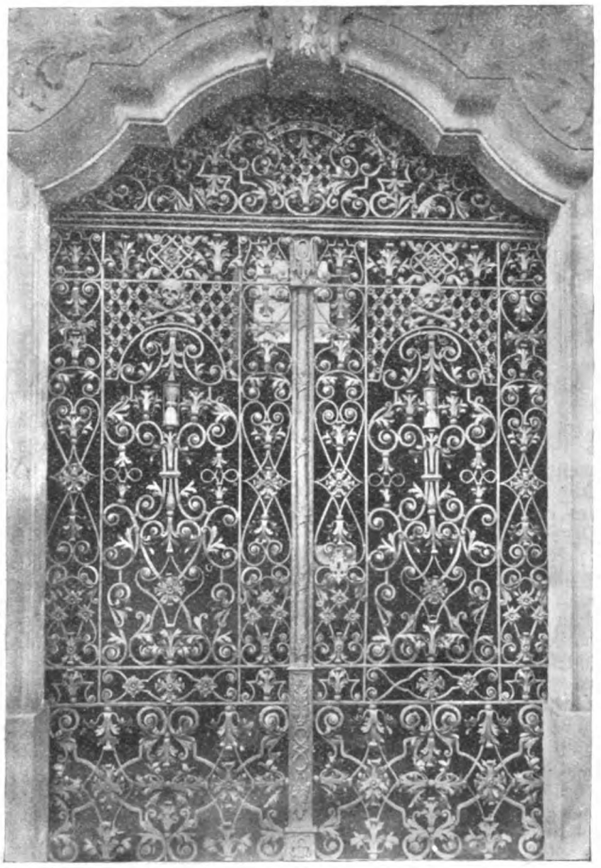


Fig. 7. Grille to Tomb of the Merchant Franz, Hirschberg, Silesia.

are few in number, but are typical, I think, of the several styles displayed, except of the very simplest. I remember among these last a masterpiece which I wish I had. It consisted of upright round staves, with curved stems semicircling between them. Each curved stem, in its turn, branched out into a single leaf that lay horizontally — a simplicity of pattern that could hardly be outdone. Yet this very simplicity, with its recurring motive of horizontal and perpendicular, gave to the little mausoleum a certain monumental air, and the technique was admirable. From an original thickness in the round upright staves of sixteen millimetres, the iron was brought down in the horizontal leaves to three millimetres.

The leaf-work of the tomb-grilles, represented in Figures 8 and 11, is rounded, being in this particular unlike the ironwork of the Renaissance in Germany, or that of other Silesian examples of rococo of the same century with this [the XVIIIth], wherein the leaf-work is always flat. The stem-work, too, differs from Renaissance patterns of wrought-iron, in being thicker by two or three millimetres. For the rest, however, there is still in the two designs the Renaissance sense of construction and distribution into orderly sections. Each leaf of the double portal has a backbone, so to speak, a solid, strong central staff and cross-stave.

But in the portals of what I consider (without proof, however) of

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the following period, the ornamentation fills the entire space of each door-leaf, and is without any constructive support save a foot cross-stave (See Figures 5 and 6). These late rococo specimens are rich, almost over-luxuriant, in design, and the varied fullness of motives betray a designer's hand of experience and adroitness and a well-stored fancy. The technique is skilful. The doors, in fact, resemble a composition of the Liszt School of music, for sheer exuberance of variation and decoration: it is hard to discover the underlying constructive idea. The line chiselling of the scalloped, waved, leaf-hung stems and flamboyant finials is as sharp and clear as could be done in brass or wood or stone. There is left but a minimum of the original alpha and omega of the iron-workers' original element, the round staff.

As for the rest, the size of the gates remains nearly the same as those of simpler patterns; the breadth of the portal, Figure 5, is 1.81 metres, the height 2.40 metres.

The masterpieces of the whole collection are the Renaissance-like portals of tombs, number 12 and 56, the family mausoleums of the Merchant Franz and Justice Hess (Figures 7 and 9). They are evidently works from the same smithy. They are admirably open and clear in construction, and while the sculpture is still baroque in style, the portals themselves show an advance of taste towards simplicity, though not without backsliding, for the crown of the portal (Figure 9), as will be observed, is predominantly rococo still. There is, moreover, a readaptation of the mediæval custom of hiding the jointings behind a fig-leaf, so to speak, of delicate ornament. The locks, on the other hand, are placed inside the doors, after the fashion of the Renaissance.

No other portals surpass these gems of beauty, but I add one illustration more, Figure 4, in order to perfect my typical exhibition, this portal being in the transitional style, a mixture of rococo and Renaissance.

L. VON KROCKOW.

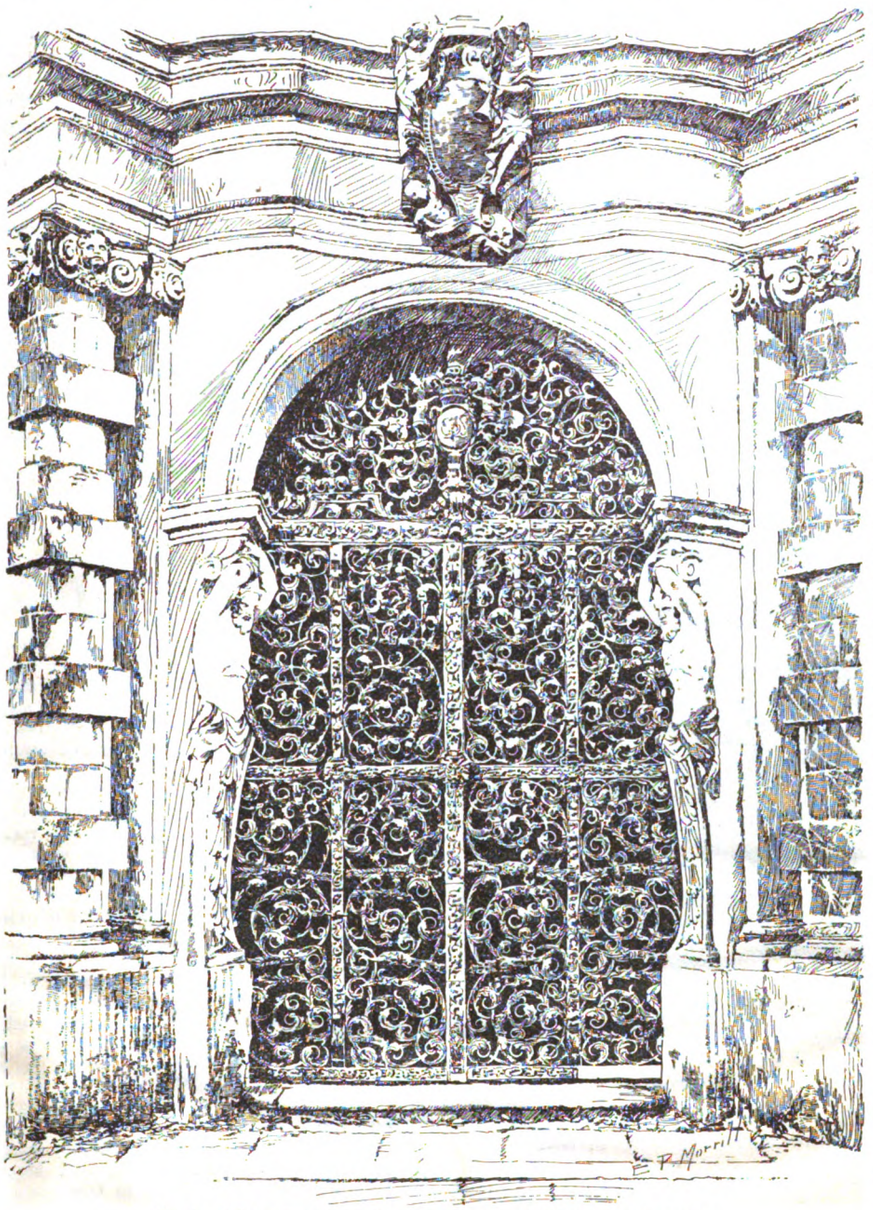


Fig. 8. Grille to Tomb of the Van Schweinichen Family, Hirschberg, Silesia.

THE SALON OF MUNICH.

THE Royal Glass Palace of Munich, with its fifty entry-halls, galleries and rooms, contains a great amount of well-lighted hanging-space and the catalogue of this year's exhibition has about thirteen hundred numbers. Mingled, therefore, with agreeable anticipations, one takes to this feast of art an uneasy sense of work to be done, if the show is to be fairly seen.

These desultory notes, which pretend to little value of comparative criticism, were made while drifting about with little or no method but that of looking at what one liked.

Where there are so many good things in the black-and-white section as here, it is as well, perhaps, to see them first, while one is fresh, the eye yet unsated with color, the imagination untired and ready to respond to the suggestion of line.

When Mr. Whistler last winter uttered that remarkable dictum, reported of him and not denied, "Black-and-white is Phil May," he must have forgotten Zorn and — among many others — himself. Or was he only trying to forget Mr. du Maurier? Not that the three have much in common. If "black-and-white" meant comic newspaper cuts, Mr. May's rendering certainly goes far on simple means; but, fortunately, there is more to it, we must in all modesty submit.

Force, directness of purpose and marvellous suggestiveness are in the etched line of Anders Zorn. In one small plate he has rendered, with unvarying downward strokes of the needle, a simple subject in which color and atmosphere are strongly felt: a man and woman are leaning over a wall and looking down into a quiet bit of harbor where some fishing-boats ride at anchor. The rough cap and knit shirt of the man, who is evidently of the sea, the flowered cotton gown and white cap and apron of the girl, the stones in the wall, the water and the boats in the bay, the grassy shore beyond, the sky above and the evening light over all, are rendered in one and the same line, and we cannot see how they are there. If you look at that little print a moment, the strong slashing lines are gone, and through them one sees the peaceful evening time with its quiet tints.

Storm van's Gravesande is an etcher of a different sort, or rather of other things, whom the world also knows. Guiette, another Brussels etcher, does a lot of different things with dainty finish. Am Ende gives us landscapes. Renouard, of Paris, and Raffaëlli show good things, each in his way.

Among the charcoal drawings is a strong bit by Josselin de Jong, of the Hague, bold in mass and full of movement — a stoker, tugging with bent back and tense muscles at the great stoking-iron, in the glare of the furnace door — a glimpse of stern, sad life.

Some drawings by Jan Wysmuller, interesting on account of their individual rendering, are done on light-toned hemp papers in black and red chalks, the high lights blocked-in sparingly in white chalk. His line is clean and sure, and there is little fussing with tones and shadows, these being lightly suggested. Among the more ambitious drawings in chalks Eduard Frankfort has one called "The Synagogue." A group of Israelitish gentlemen in hats, and the architectural details of the interior, are well drawn; the subdued color-effects in dim light are strongly suggested with the skilful use of a few simple chalks. The Dutchmen have a number of good things in this medium, which is excellent for making rapid color-notes from nature.

There is a clever little drawing in brown wash, "The Sick Child," by Arthur Briët, of Nimsput, in which the brush-work is admirable. One regrets that such a charming sense of delicate tonality has not expressed itself rather in color.

Mr. Walter Crane has two drawings on brown paper, in brown line and wash, from the story of the "Goose with the Golden Eggs," and his sketch for his painting in oils, "The Race of the Hours."

Twenty-four illustrations to "*Grimm's Fairy Tales*," by Hermann Vogel, of Dresden, have deservedly won a second medal. Mr. Crane's painting of the "Hours" has received the same award, by the way. Everyone knows Mr. Vogel's work in the pages of *Fliegende Blätter*.

In the same room are six *gouache* drawings from the great

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illustrator Daniel Vierge. That master's wonderful power of catching with rapid brush the rush and quickly varied groupings of a crowd, were never better expressed than in two of these, the one a night orgie in Paris, of people drinking and dancing and scuffling under the smoke of flaring lanterns, the other a panic in a Spanish town, the people flying down a narrow street before the onslaught of a great long-horned Andalusian bull. The dash and vigor of these two pieces are quite beyond words.

Lunois of Paris, Thoma and Steinhausen, of Frankfort, and Van Hoytema of Voorburg, show interesting lithographs. There might have been more of this art, which has made such strides of late. A great quantity of first-rate lithographic color-printing is done in Munich, and much very beautiful and original work in designs for lithography is turned out by Munich artists. Some of their posters are very clever.

In the exhibit of the Munich Etching Society one is struck by some very forcible work of Fritz Erler's, for illustration in color, and for ceramic decorations. Naager's book-marks and *ex-libris* are also noteworthy. His rendering is not unlike that of Josef Sattler, whose work in that line certainly has no equal in Germany to-day. A Berlin publisher has gotten out a book of color-prints from Sattler's drawings of *ex-libris*, an admirable work and well worth its price, forty marks, to lovers of the Old German style of prints. It is in this direction especially, that of decorative printing, that the Munich school of to-day is distinctly original and effective. Their work, while founded frankly upon the models set them by the Old

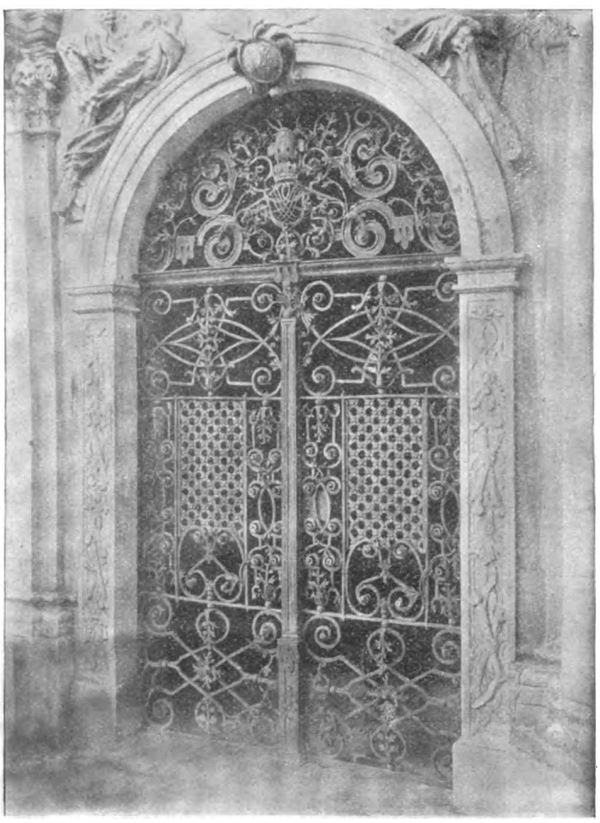


Fig. 9. Grille to Tomb of Justice Hess, Hirschberg, Silesia.

German Masters of the fifteenth and sixteenth centuries, has developed beautiful solutions of the modern questions of book decorations and poster-printing.

Among the aquarellists the greatest name is easily, to my mind, that of Hendrick Willem Mesdag, of the Hague. Of his two large subjects here, that called "Fisherboats Homeward Bound" is the more striking, in its powerful rendering of the storm-swept sea; but one must not miss, in enjoyment of it, the subtilety and the glorious color feeling shown in the "Sunset on the Scheveningen Beach." The soft grays and browns with which the great Dutchman usually makes a drawing give place in this sunset to a Turneresque gorgeousness of color. Perhaps no painter has fewer colors in his box than Mesdag. Analyze one of his drawings and you will see that he uses not much more than a half dozen. Reserve in interpreting nature is a strength which he possesses in high degree.

Other Hollanders have strong work among the water-colors.

The Scotchmen exhibit work which suggests analogy with that of the Dutch School, they possessing the same force of reserve, and expressing their thoughts, as they see things, in the cool gray light of the North Sea. Terris, Nisbet and Laing among them, and, say, Valkenburg and Van der Waay, of the Hollanders, are not far apart in their aims. Belgium is represented by Van Leemputten, of Antwerp, and Uytterschaut, de Burlet and Hagermans, of Brussels.

Zetsche, of Vienna, has sent two or three small drawings, mostly of picturesque groups of houses, which are bright and clever.

The great thing in water-color, as in all art, of course, is not to do too much. Italian water-colorists have always seemed to me to demand too much of their medium.

A pair of figures in large size by Puig Roda, of Rome, done dashingly on a sheet of coarse paper, of which much is agreeably left, are in the right way, the rich stuffs of the costumes being not so strongly insisted upon as is usual in the work of this school, and yet sufficiently expressed.

In the art world of Munich the cult of the Queer has not a few adherents, and among the work of those who are sacrificing reasonableness and beauty in misdirected attempts at originality and mysticism, a couple of water-colors by Karl Strathmann, "A Dream" and "Maria," are most unutterably strange. The exhibitions of last year, particularly that of the Secession, were, however, much more over the heads of ordinary folk in respect of aberrations than are this year's; whence we may, perhaps, hopefully infer a tendency to come back to rational, intelligible painting. There is still no lack of pictures glorious in purple meads and scarlet trees, among which wanders humanity in various stages of decay, but they do not crowd the walls of the Secession as they used.

It is a pleasure to turn from this kind of thing to the charmingly dainty and decorative little color-drawing by Karl Arends; or to the frankly painted "Galician Motive" of Anton Kosakilwicz, both Munich men; or to Alfred Parsons's Japanese scenes; or to a fresh bit of nature, by Vierge, a mere study from a window looking across the roofs to a cloud, breaking in rain upon the distant hills; or to the same master's sketchy transcript of a couple of Spanish peasants.

Among the oils, a big canvas by the Russian Ilja Repin, "Answer of Free Cossacks to an Ultimatum of the Sultan," has taken one of the two first medals. The other medal is held by Mackensen's "Gottesdienst," a picture quite at the other end of the scale from Repin's gorgeous color and coarse realism. Repin's Cossacks are those fierce, wild-riding, fearless devils who belong to the southwestern part of Asiatic Russia, the region about the northern half of the Caspian Sea and the great Kirgis Steppes: coppery yellow chaps with a look of the Mongol about their shaved heads.

In the group of chiefs gathered about a table in the open air, the figures are crowded down to the front of the picture, so that the foremost are painted boldly in large scale. Inflamed with feasting, they are composing their cartel of defiance. The lust of fighting is on the barbarous faces. From the onlookers crowding round one almost hears the hoarse clamor and laughter they are raising over some well barbed taunt for the ancient enemy who would make them his slaves. In the background the tribesmen tend their horses or move about in the smoke of the camp fires. The tanned, greased and grimy skin of neck and half-bared arm and chest, the swollen, wild, brutal eyes, the dress and trappings show masterly knowledge of brush-work; the barbaric richness of tissue, dagger and mat are not forced; there is no suggestion of studio properties and the curiosity-shop.

Mackensen's prize picture is all of peace. On a fresh morning of early summer in North Germany, a little group of country-folk is at divine service in the open field. From a rude pulpit, set up under an apple tree, an elderly minister in gown and surplice is reading or preaching to the earnest upturned faces of the peasants. Some of these are hard and seamed by age and toil, some with the fresh beauty of youth upon them. The color is quiet and cool, the brush-work very restrained throughout.

Mesdag's three sea pictures merit more attention than they seem to have had from the jury. One rather feels that the Dutchmen have not fared so well in the matter of prizes as they seem to have deserved, for, beside Mesdag's, they have a lot of other good things here. The work of the Düsseldorf men also makes a strong exhibit.

Anton Henke's "Waldeinsamkeit" — Forest Loneliness — takes second medal. Olof Jernberg shows a strong fresh bit of landscape, "After Rain."

Arthur Kampf's portrait of a little boy is done in the right way, Bretz's canvases are well painted, and Marx, Wendling, Harzog and Munthe have sent in work of merit and interest. From Antwerp comes Frans van Leemputten's big canvas, the "Jahrmarkt," one of the few horse-pictures in the exhibition. It is full of truthful rendering of the life of such a scene as Rosa Bonheur has immortalized in her great picture, with a pleasant setting of the quaint houses of a little Flemish village.

There is a military picture by Abry, with horses standing, which excites rather less critical objection than the ramping beasts by Rocholl of Düsseldorf. It is not given to many to paint the horse in action. There is no lack of brush-men who attempt it, but, remembering Meissonier, Fromentin, Detaille or Aimé Morot, the measure of their success seems small. Kowalski-Wierusz has done well with the horses pulling some wagon-loads of peasants, "Going to Church." Paul Tavernier, who lives at Fontainebleau on the edge of the great forest, has painted hunters, hacks and hounds to the life in his "Stag Hunt."

"Ein Ritter," by Fritz Boehle, of Munich, is an armed knight who rides with his great red lance into the shadows of a wood. His good steed is a gray stallion of Flanders, such as Dürer loved to draw, and our Howard Pyle has lovingly learned from the master.

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Dürer's two knights of Nuremberg, in the old Pinakothek at Munich, recall themselves with their grim dark faces and their slim muscular forms in steel over red cloth. The painting of the armor, the leather trappings and the great Flemish war-horse is marvellous in its realism, as is the bit of mediæval landscape behind, full of mysterious suggestiveness. Their great contemporaries having done them this ample justice, we ask why should modern painters waste time evoking these iron-clad phantoms out of the past?

After all, there will be not more than one or two men, in a generation of art, gifted with real mediævalism of feeling. They say Puvis de Chavannes has it. Classicism is less rare. For example, there are Mr. Alma Tadema's English Greeks; and Tadema's imitators are numerous. But Mr. Tadema's skill and erudition are giving us graphic histories of a life not fully or well recorded in the pictorial art of its day.

Mythology, too, still has its charm for the painters. The rest of us have rather tired of it. Karl Strathmann, of Munich, has a picture in this line, the "Cranes of Ibycus," somewhat wild and weird in treatment, and rather more of a tapestry design, perhaps, than an easel picture, but, as mere color, richly decorative.

And Böcklin's centaurs are conceived less coarsely than Stuck's in the Secession. But is the centaur an engaging subject? As a circus-poster freak he might draw, but he is not "Art." Böcklin is revered in Germany. His gloomy compositions are more effective in monotone print than in color, where he is harsh. His female figures — he is fond of a lone one against the sky — are wooden and stiffly draped.

Gabriel Max, another of the great lights of Munich art, sends an uninteresting "Pandora." His "Old and New World," apes of the East scraping acquaintance with their long-tailed western brothers, a strong bit of animal painting, is more to our minds.

Laurens, of Paris, gives us Pasiphaë and the famous white bull, though not quite as Virgil told it.

Some young ladies in their skins, seen in landscape by a bit of water, are down in the catalogue as "Nymphs." Generally speaking they seem not to the manner born, and have an air of waiting for their clothes. But even Titian's Venus of Urbino — it was the Duchess herself — in the Uffizi, looks a little anxious about the robes her tiring-women are frankly getting ready in the background.

To be quite candid one must admit that there are too many pictures in this collection. At least one-third less should be there. Naturally, the proportion of pictures sold is appallingly small. I read somewhere not long ago that the money paid in a year in Paris for pictures bought would not buy canvas and paint for the pictures painted; and I have no doubt it is true in Munich as well.

A. B. BIBB.

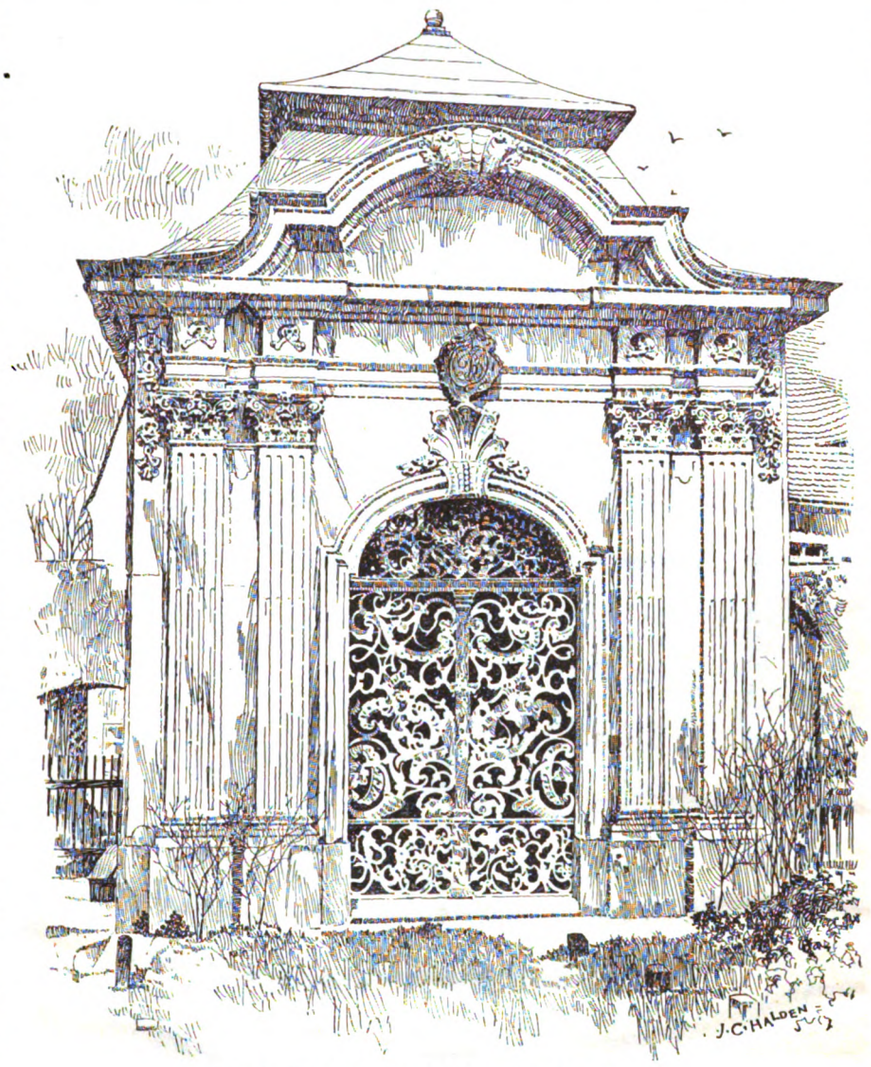


Fig. 10. Tomb of the Merchant Kunze, Hirschberg, Silesia.

HOUSES OF WOOD PULP. — You can build a house out of sheets of wood pulp now if you incorporate sheet-wire gauze in the material. It can be made waterproof, fireproof, coldproof and stronger than planking. Moreover, the material can be made to represent almost any other material, and can be moulded into almost any shape. Great is wood pulp. — *Paper Mill.*

UNDERGROUND LONDON.

THE commercial prosperity of large cities depends so much upon the facilities afforded to their inhabitants for rapid and convenient travelling, that such an important and novel undertaking as the construction of the Central London Electrical Railway must naturally be regarded more as a public benefit than as a public enterprise.

When we remember that at the beginning of the present century the stage-coach was considered not only a luxurious, but even a speedy mode of travelling, the opportunities of which we are now able to avail ourselves are so numerous, that we are lost in admiration at what has been accomplished in recent years for our welfare and comfort. Carriages, cabs and omnibuses are now to be found everywhere, and horseless carriages threaten to give a new aspect to road-traffic, already diversified by the ubiquitous bicycle. And our islands are covered with a network of railways, the construction and maintenance of which are alone able to give continual employment to a vast number of people.

The principal object of the new underground line, which is about to be made, is to provide a means of travelling which the Metropolitan and Metropolitan District Railways are unable to offer, since these, while encircling the busiest portion of London, leave the general traffic along the main thoroughfares to be dealt with by the omnibus and tramway companies. Recognizing the importance of travelling in a straight rather than in a circuitous route, the promoters of the Central London Railway have naturally decided to adhere to this principle wherever possible; and thus commencing at Shepherd's Bush, at the extreme west of London, their line runs nearly due east, passing under Uxbridge Road, Oxford Street, Holborn and Cheapside, to the Bank of England.

There being no railway in this country along a route so crowded as that between the Marble Arch and the Bank, it is almost impossible to estimate the number of people that will be likely to avail themselves of the great convenience offered by this line; but the development of passenger traffic on the Metropolitan Railway during the last thirty years would seem to indicate that at least sixty million people will use the new railway annually.

The first attempt to construct underground railways was made in London in 1853, when Parliament sanctioned a scheme to construct a line from the Edgeware Road to King's Cross, a distance of two and a quarter miles, and from this small commencement grew the two lines now known as the Metropolitan and Metropolitan District. It was at first intended that these lines should be confined exclusively to a local business, much in the same way as the elevated-railways in New York — that is, without direct communication with other lines. This arrangement, however, did not prove to be very profitable, and it was then sought to obtain additional revenue by making connections with various main lines for the interchange of passengers, and to enable these railways to run their trains into the central portions of the city, while at the same time the new company, by making various extensions, began to develop a suburban business.

The construction of all these early underground lines is similar in principle, although subject to considerable variations, necessitated

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by the different localities through which they pass. They are worked by steam-locomotives which discharge the product of combustion directly into the tunnel, and no method of artificial ventilation is attempted. The evil consequences attending this system are minimized as much as possible by burning the best quality of coal, which is practically free from sulphur, and which makes but little smoke. The engines employed on these railways are of a condensing type, so that the steam, instead of being exhausted through the chimney, as in the case of an ordinary locomotive, is conveyed into a water-tank and condensed, by which means the air in the tunnels is kept drier, and is therefore less disagreeable than it would be were this precaution not adopted.

The cost of making a double line of railway of this kind may be assumed generally to be about a quarter of a million pounds per mile; but where great difficulties are experienced, such as were met with on the portion under Cannon Street, and the immediate neighborhood, where the work had to be carried on below one of the busiest thoroughfares in London, the cost per mile amounted to four hundred thousand pounds; and it is probable that, when all other expenses are included, the cost for such a portion as that would not be much less than one million pounds.

It is unfortunate that the earnings of these two companies cannot be regarded as entirely satisfactory. The immense capital required to construct such railways, and the low fares they are obliged to charge, owing to the keen competition with which they have to contend, are the two principal reasons why the profits appear comparatively small; and, although such a state of affairs is to be regretted, it does not necessarily indicate that underground railways generally are unremunerative.

The City and South London Railway, which, commencing at the Monument and passing under the Thames, terminates at Stockwell, is one of the most interesting lines that have been recently constructed. This railway, which was opened to the public only in 1890, consists of two cast-iron tubular tunnels, generally placed side by side, at a depth varying between forty and eighty feet beneath the surface of the streets. These were built by means of the "Greathead shield," a method of construction now being so successfully employed at the tunnel which the London County Council are making under the Thames at Blackwall, and one which it is also proposed to adopt for carrying out the work in connection with the Central London Railway.

Between the Monument and Stockwell there are only four stations, and these being generally some fifty feet below the ground, hydraulic lifts are provided for the convenience of the passengers using the line; the cost of working these lifts is, however, considerable, amounting to about five per cent of the earnings of the company.

A uniform fare of two-pence is charged for any distance, and there being but one class, no tickets are issued, the payment being made on passing through the turnstiles on entering the stations. During last year nearly seven million people travelled by this railway, and the financial prospects of the company are now considerably brighter than during the early days of its existence. Ventilation is secured automatically by the piston action of the trains, each train propelling in front of it a column of air, which ultimately finds its way to the streets through the shafts provided for the stairs and lifts; meanwhile the train draws down a supply of fresh air through the similar openings behind it.

As electrical locomotion is adopted, the air in the tunnels is comparatively fresh, the carbonic-acid gas exhaled by the passengers being the chief source of vitiation; but although in this respect it is considerably better than at various places on other underground railways, it will be generally admitted that the quality of the atmosphere is yet susceptible of further improvement. This railway has received both the warmest commendation and the most stringent criticism. It offers to the public a direct route to many places on the south side of the Thames, and does not suffocate it during the journey; but at the same time the inconvenience of small carriages, and several other minor defects, are very apparent. It must be remembered, however, that the company experienced considerable difficulties in making the line at reasonable cost; and when the work was undertaken, one of the objects was to demonstrate the feasibility of this method of construction, but as financial resources were limited, the smallest practical tunnel was adopted in order to reduce the expense as much as possible.

Any carriage that can be run in a tube which is only a trifle over ten feet in diameter cannot easily be made very comfortable, while its restricted dimensions are also responsible for the air in the tunnel not always remaining as fresh as it might be. In all future railways that will be built of this type, these drawbacks will, no doubt, be either wholly obviated, or at least much reduced, by making the tunnels of considerably larger diameter, thus allowing both the volume of air and the size of the carriages to be increased.

As will be readily understood, the electrical locomotion on this line is of a very interesting character. The engines, which weigh from ten to fourteen tons, are capable of hauling trains consisting of three carriages, each thirty-two feet long, and of sufficient size to contain thirty-two passengers. The average speed from terminus to terminus, including stoppages, is eleven miles per hour, or, excluding these stoppages, thirteen miles per hour. Between the stations, however, from twenty to twenty-five miles per hour is attained. — *Chambers's Journal.*

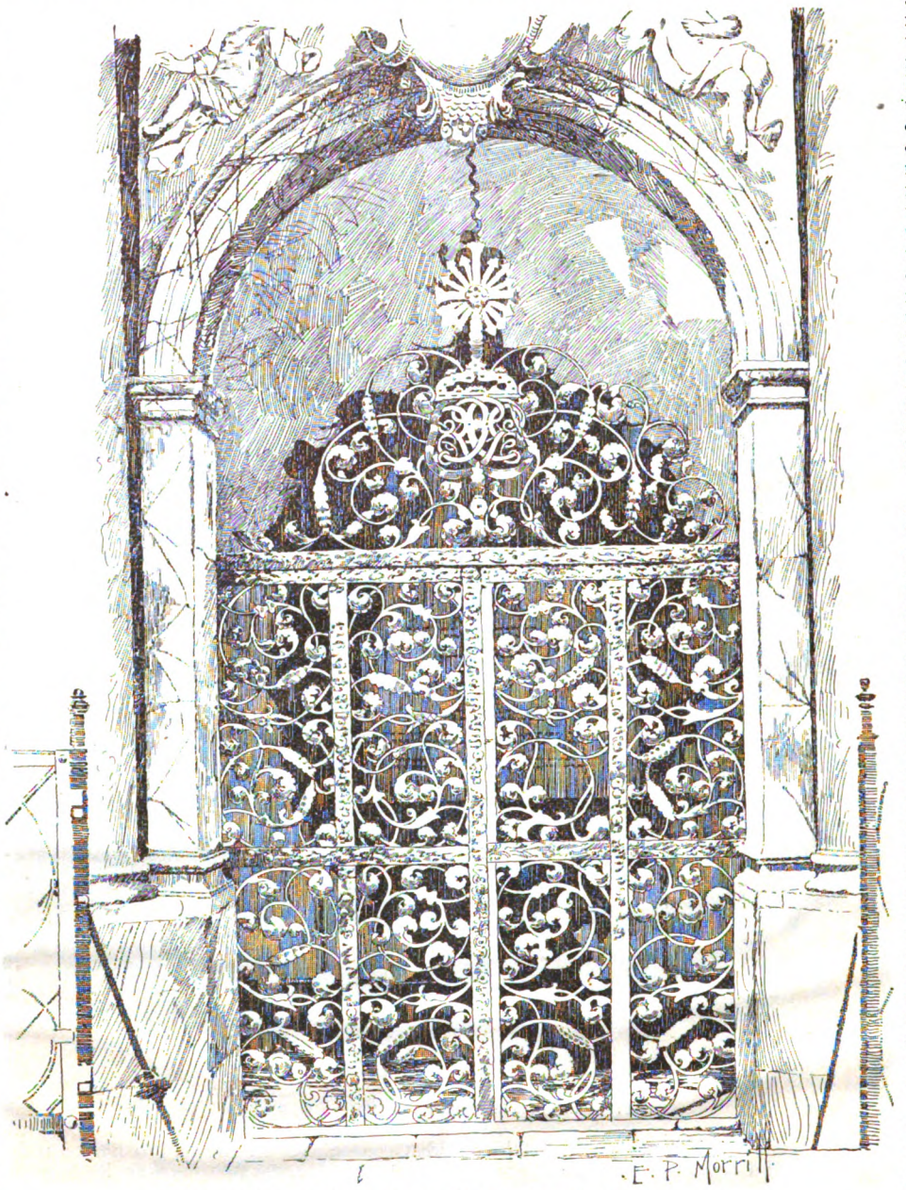


Fig. 11. Grille to Tomb of the Landed Proprietor Schaeffer, Hirschberg, Silesia.

The Results of Forest Devastation. — Ten years ago the logs from the Menominee River, Wis., lumber region ran four or five to the 1,000 feet of lumber; in 1890 they averaged six to the 1,000 feet, and now twelve, fifteen and even twenty logs are required to furnish as much. In five years the decrease in diameter of pine trees has been 35 per cent. — *Exchange.*

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OLD PULPITS.

"EVEN in the thickest crowd," Dean Swift remarks, "there is plenty of room overhead"; "but the difficulty is to get there," says the London *Standard*. Philosophers, he tells us, have managed it by building various edifices in the air; and of these the pulpit is chief. In very early times there were no pulpits; the preacher stood — as St. Augustine says he himself did — on the altar steps. His next ascent was to the "ambo," a raised station in the choir, from which, at one period, the gospel and the epistles were read. The erection of pulpits in the nave was a later idea. Abbot Samson, whom Carlyle has celebrated in "*Past and Present*," had one placed in his church at Bury St. Edmunds, and thence, as his chronicler Jocelin relates, "he used to sermonize the people in English." This was about the time of Richard I, but pulpits did not grow common in England till long afterwards.

Though a few of the thirteenth century still remain, most of our Gothic ones, unless they are quite modern, were put up between 1350 and 1550. In 1603 a pulpit was ordered to be placed in every church not already so furnished. Stone, at this date, seems to have gone out of fashion; and the new pulpits were generally made of "that excrescence of the earth," as a seventeenth-century nobleman called it, "which Providence has provided for the payment of debts," namely, oak timber. With this alteration the drum ecclesiastic became more resonant than ever. Sometimes it lent itself to quite illegitimate effects. At Twywell in Northamptonshire, for instance, there is, or recently was, a wooden pulpit with the front panel split. The village tradition is that a preacher in Cromwell's time purposely kicked it out to impress a particular text on his hearers. A hundred years later the zeal of the Puritans had given place to the drowsiness of the Georgian clergy. It was then, according to the poet Cowper, that pulpits were first covered with crimson velvet. The local squire, though he could generally cut the sermon short by standing up in the pew, did not like to have his nap disturbed while it lasted; and he guarded himself against unexpected noises under pretence of beautifying the structure from which they might have come.

Many outdoor pulpits remain. There is one looking into the court of Magdalen College, Oxford. It is entered by a door at the back, and covered by a stone tester or canopy, which shelters the occupant from rain and rough weather. There is a still finer one at the Cathedral of St. Lô, in Normandy, another at Notre Dame, Vitré, and a small one recessed in the wall, at Pistoja, in Italy. Perhaps the most striking is at Prato, in the same country. It is circular in plan; it stands out bodily from an angle of the church, and is protected by what, if it were of wood instead of marble, might be called a great coffered sounding-board. Being very large, its general effect is remarkable enough, but it is also noticeable for five or six beautiful groups of winged boys, with which Donatello sculptured its panels. Refectories, in monkish times, often had pulpits of their own. There is a picturesque one at Shrewsbury Abbey, and others at Great Walsingham and at Wells. Granite pulpits, covered with fanciful ornaments incised with a pointed hammer, and of course unpolished, may be found in Devonshire and Cornwall. There was formerly a wrought-iron pulpit in Durham Cathedral, and there are one or two modern ones in London. For really fine specimens in this metal, however, we must go to Spain, and especially to Burgos and Avila.

Old English stone pulpits were generally small, so small that some of them may even yet be unknown, having been hidden away under later additions. This was the case with one of much beauty, discovered about thirty years ago during a restoration at Shipton-under-Wychwood. Being very diminutive, it has been shaped out of a single block and, like Merlin in the hollow tree, it had been long afterwards enclosed for generations in the once fashionable "three-decker." This fate could hardly have overtaken our largest examples, such as that in Trinity Church, Coventry. But mediæval Italy was the place for immense and magnificent pulpits; so magnificent that, as Mr. Ruskin remarks, even the clergy for whom they were built seldom cared to use them. As Beatrice says of Don Pedro, they were "too costly for everyday wear," and the preacher who was in earnest preferred a humbler standing-place. The cast of one of them in the South Kensington Museum is familiar enough; but few people who pass it know that for ages its original has ceased to exist, except in scattered fragments. Sculptured for Pisa Cathedral by Giovanni Pisano about the year 1302, it remained there till 1596. Then came a great fire, in which the roof of the church was destroyed. The pulpit was much injured. Its panels were removed to the crypt, other portions were placed in the Campo Santo, and out of the rest was made a smaller and plainer structure, which is still in use.

There is a specimen at Pistoja little inferior to what it was when perfect. The Pisan one is round, while this is oblong in plan. It is attributed to Guglielmo d'Agnello, and its archaic looking sculptures of Scriptural subjects have a quaintness not easily forgotten. The sculptures are the glory of early Italian pulpits, though sometimes, as at Ravello, near Naples, geometrical patterns in mosaic take their place. Variations of this sort, however, are almost confined to the parapet or enclosing wall. In whatever way it is treated, the mediæval artists of Italy nearly always supported it on a number of light and graceful marble columns, and each column, again, usually erected on the back of some such beast as a lion. Our English pulpits were satisfied with less ambitious ornaments. We have native marbles of much beauty, but, with the exception of the dull bluish-gray one which is quarried at Purbeck, they were neglected in the Middle Ages. Instead of mosaics, we had tracery; instead of figures, we had carved foliage; and instead of costly materials, we had colored decoration. Sacred emblems were also introduced, and sometimes royal or national ones. The pulpit at St. Savior's, Dartmouth, for instance, is carved with the Tudor rose and portcullis.

In the autumn of 1634 three adventurous officers from Norwich set out to see the cities of their native land. The manuscript journal of their seven weeks' ride is preserved in the British Museum. At Bristol, they say, "Wee found eighteen churches, which are all fayrely beautiful, richly adorned, and sweetly kept. Their pulpits are most curious, which the citizens have spared no cost nor forwardnesse to beautify." Many of these, perhaps, had been recently set up, under the order of 1603. Though Gothic had then died out, and wood instead of stone had come in, some works of this late date are artistic as well as elaborate. St. John's Church, Leeds, has one to which the description of the Bristol pulpits would apply. It is singular, and must have been costly. There is little to mark it out for any religious use. The details profusely lavished on it are those with which everybody is familiar in Jacobean chimney-pieces and wainscotings. Above, a vast sounding-board, which effects a massiveness it does not possess, projects from the wall in a preternatural-looking way, without visible means of support. This was the fashion of the period. It loved long sermons, and put up sounding boards that not a word might be wasted. Whether they had much effect is doubtful. When they are really shaped on scientific principles, they are apt to work both ways — not only making the speaker audible to the congregation, but bringing back to him their faintest whispers in return. They did not reach this perfection in olden times, or they would not have been tolerated so long. North of the Tweed they were once held indispensable, and only the hour-glass vied with them in importance. Experience seems to have shown the desireableness of keeping this out of the preacher's reach. Some Scottish pulpits stood on a low platform — much as a teacup stands in a saucer. Then the hour-glass was fixed in a little cage attached to this lower structure. When this could not be, it was placed against the pulpit front, but in nearly inaccessible positions under the book-board. Yet even there it was not secure. Preachers arose whose arms were as long as their sermons, and tradition tells how, at the risk of overbalancing themselves, they would stoop and turn the hour-glass just as their audience were looking for a happy release.

BOOKS AND PAPERS.

THE Lord Mayors were always mixed up in the doings of the Cathedral of *Paules* or *Powles*, as we glean from the most interesting books of Dr. Sparrow Simpson,[1] upon the Old World life in and about the great church. They went there upon their election, praying at the various shrines, and joined in the processions and rejoicings celebrating divers auspicious events. To wit: when Edward III was born, they accompanied the commonalty to the cathedral and "led carols to the sound of trumpets," and the following Monday they assisted at a pageant where the "conduit in Cheap ran with nothing but wine," for a pavilion was erected over a tierce of wine for all passers-by to drink thereof.

The first idea of a strike seems to have been born in 1327, when a day of love was appointed in St. Paul's for the reconciliation of the disputants, a saddler and a painter. The latter seems to have behaved ill, and got the joiners and gilders to join him, and so compel the saddler to give way; but the aldermen interfered, and compelled the two Williams and their friends to end the strife, appointing the Feast of St. Dunstan, the day of love.

Here is another ill-mannered citizen, a baker, one John Brid, who in the same year for his own gains made a hole on his "molding borde" after the manner of a mouse-trap; and when his neighbors brought their bread and cakes to be baked, he put the dough upon the board *over the hole*. Then having a servant underneath, the latter craftily collected great quantities of dough "falsely, wickedly and maliciously to the great loss of his neighbours." But John Brid was not the only representative of this sharp practice. Other bakers and bakeresses were found guilty of a like offence, and they were condemned to be put upon the pillory with lumps of dough about their necks, and "so remain until vespers at St. Paul's in London shall be ended." The tables were destroyed, "for it is neither consonant with right, nor pleasing to God, that such falsehood, deceit and malice shall go unpunished.

Is the origin of Paternoster Row known to all men? It appears that in 1379 there were stalls about the "Brokencros," which were let to divers women: to three at 10 pence and to four at 6 pence yearly rent. The *Broken Cross* was erected by the Earl of Gloucester in the reign of Henry III; but in 1390 it was removed, and these *stationers*, who dealt in various wares, retired into Paternoster Row, and became the forerunners of the present stationers and booksellers.

[1] "*S. Paul's Cathedral and Old City Life.*" W. Sparrow Simpson, D.D. (Stock).

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On the Feast of Penticost, it was the custom of the mayor and aldermen to attend St. Paul's, the latter in cloaks of green lined with green taffata, or *tartaryn*, a thin silk. But in 1382, one John Sely, alderman, appeared in a cloak *without a lining*, hence much deliberation as to the measures to be taken in view of so grievous an offence. The mayor and aldermen discussed, and decreed that they should all dine with the said John, at his proper costs; "and, further, the said John was to line his cloak in manner aforesaid, and so it was done."

Wrestling was not permitted within the "*boundes of Poules, ne in non other open place within the Citee of Londone.*" But lawyers and other persons seem to have been allowed to do business in and about the church, the men of law taking up their station at a particular pillar, there to receive clients or payment of debts.

The christening of Edward VI must have caused as much suffering to nervous citizens as our German bands and grinding-organs. Fancy the shooting of guns *day and night*, and the burning of fires in the streets! The lighting of the streets was done cheaply in those days for the *prestes of Pawles* were bound to "fynde a lanthorne lyght all this wynter season, upon payne of imprisonment," even "as the cytezens and inhabitantes of this Cytie comenly doo." But there was little respect paid to "S. Pawle." In 1554, it was a mere passage for the "comen caryage of greate vessells full of ale and Beare, greate Basketts full of Bread, fyshe, fruyte and such other things," which was very "unsemelye and unreverent." They even lead "moylls, horses and other beasts thuroughe the same unreverentlye to the greate dyshoner and dyspleasure of almyghtie god and the greate grefe also and offence of all good and well dysposed persones." These offences the mayor and aldermen punished by various fines, part of which went to the poor at Christes Hospital within Newgate.

Sanitary measures are noticed in 1567, the "gutter whereby the rayne water falleth uppon the offycers of the Cytie and other attendinge uppon my Lord Maior and the aldermen in the sermon tyme at Paules Crosse," was ordered to be "turned and diverted from the place where yt now falleth into the este ende of the same place." The bench upon which these officers sat seems not to have been overcomfortable, for at the same time it was ordered to be "enlarged as muche as yt convenyently may be so that they may quyetly syt there duringe the tyme of the sermons there."

Those who are occupied with the history of decoration will find Mr. Petrie's new book[1] an eminently practical manual; practical both in the sense that it is small and packed with information given in the most concise form of statement, and also because of its notable lack of theoretical speculations on the origin of the many motives he discusses. His object is to trace each of the familiar types used in Egyptian decoration back to its earliest appearance in extant works of art, and then to note the developments and transformations it underwent in the course of Egyptian history, with the dates of these so far as they can be determined. Beginning with the line, he follows this through its various geometric evolutions, the zigzag, wave, spiral, fret, and their combinations; then takes the natural forms, such as the feather, rosette, lotus, papyrus, and other vegetable and animal types; following which is a brief but suggestive chapter on the origin of certain structural forms which are peculiar to Egypt and a chapter on symbolic decoration. Scattered through the text are many small cuts which, though unpretentious, are of great assistance in making the author's meaning clear without too much explanation.

For work of this kind no one is better equipped than Mr. Petrie, both by experience and temperament. Within the last few years he has won himself a place in the first rank of Egyptologists, and to his knowledge he has added a remarkable ability in the collation of data bearing upon his argument, as he has shown more than once. This ability is strikingly displayed in the present book, and his conclusions may be accepted as coming from one of the safest of authorities upon this subject. Some of these conclusions will, doubtless, be a surprise to many of our readers, as, for example, the long interval of time which elapsed between the introduction of the zigzag and the wavy line. The former appears in the oldest tombs, dating about 4000 B. C. "So simple is this, that it might be supposed that every possible variety of it would be soon played out," as Mr. Petrie says, yet the wavy line does not occur for about 2,500 years, its earliest examples being found in works of the eighteenth dynasty, about 1500 B. C. And the spiral, although the earliest instance of it is on a scarab of the fifth dynasty, was apparently not developed into a continuous design until the twelfth, a thousand years later. Even then it is rarely found on walls and furniture, and as a border it does not appear until the eighteenth dynasty, reaching the highest point of its development in that and the two dynasties following. The fret or meander is also a late development, and according to the author, the fret patterns are all modifications of corresponding spirals. "The cause of such change is obviously the influence of weaving," he says, "frets in general are ery rare until a late period, and they doubtless depend on the adaptation of spirals to textiles." This may be true in Egyptian art, but it cannot be laid down as a general principle, because, to take the example of Greek art, which he cites, although it is true that the angular fret does not occur on works of the Mycenæan period, it is a characteristic ornament of the early "geometric" vases, which, though later in date, represent an equally primitive condition of Greek art; and we find it scratched on the pre-historic vases of Italy, in a rudimentary form, where it appears as a natural development of the straight line.

Another interesting point Mr. Petrie brings out, convincingly, as it seems to us, namely, that the feather is a much more common motive of Egyptian decoration than is generally supposed, and that many of the so-called scale-patterns are really derived from feathers. On some royal coffins of the eleventh dynasty he finds several types of these patterns on the wings which envelop the mummy. Here it is obvious that they are feathers, and of different design according to the place they occupy on the wings; and finding the same patterns on the belts of kings, and on the sides of thrones, he concludes that in the one case it was a belt or band of feathers worn as a protection against chills — as it occurs in peaceful scenes, not battles — and in the other a feather rug. Later, it became conventionalized into an ornament in which all sense of its original significance was lost. The convolvulus is another decorative motive which "has scarcely, if at all, been acknowledged as an Egyptian ornament," yet it is common in the fields of Egypt, and Mr. Petrie finds that it often occurs in the eighteenth and nineteenth dynasties, the great period of Egyptian decoration, though its leaves have been miscalled lotus-buds or "tabs."

As will be seen from what we have quoted, Mr. Petrie's pages are full of suggestiveness. We cannot notice all they contain of interest to the student of design and will select as a last example his ingenious contribution to the much-vexed question of the origin of the Greek anthemion or "palmetto." Starting from the established fact that the Egyptian frequently drew the interior of an object above its profile — a cup or dish, for instance, being drawn in a side-view, with its contents rising in a cone above it, though they were really supposed to be inside — he applies this principle to flowers, especially the lotus, and concludes that the projection which we see rising between the two sepals in the conventionalized flower is the third or back sepal, while the fourth, to avoid confusion was so foreshortened as to disappear almost entirely. Then the inner petals were introduced into the design, generally three, but somtimes five or seven, spreading in a fan-shaped cluster, and gradually these became the important part of the design, crowding the sepals down to a comparatively insignificant base. In the eighteenth dynasty a schematic diagonal view was introduced, in which all four sepals were given equal importance, the front two being curled down, and the rear two up, with the petals rising from them as before. By this time the flower had become entirely mechanical, and it was in this form that it was adopted and developed by the Assyrians, and as he thinks by the Greeks. "In the Greek designs, however barbarous they may seem in comparison, owing to their hopeless divergence from any rational type, yet the same elements remain. . . . Thus the Greek anthemion with its double curves is fully accounted for, the lower and upper sepals being still distinguishable in the two spirals on each side at the base of it."

[1] "*Egyptian Decorative Art.*" A course of lectures delivered at the Royal Institution by W. M. Flinders Petrie, D. C. L. New York: G. P. Putnam's Sons, 1895.



ENGINEERING ASSOCIATION OF THE SOUTH.

The annual meeting for 1895 was held at headquarters on the 14th inst., President Dudley in the chair. "Present" were: Messrs. H. McDonald, Blackie, Leftwich, Ruhm, Pieton, Kirkpatrick and Brown.

Messrs. Blackie and Brown were appointed tellers to canvass the ballots, and while this was in progress the Secretary and Treasurer presented their annual reports, which were accepted and ordered filed.

The Canvassing Committee then reported that the following were declared elected: *President*, Mr. Hunter McDonald; *First Vice-President*, Mr. W. G. Kirkpatrick; *Second Vice-President*, Mr. J. J. Ormsbee; *Secretary*, Lucius P. Brown; *Treasurer*, Mr. W. M. Leftwich; *Directors for Tennessee*, Maj. E. C. Lewis, Dr. W. L. Dudley, Mr. Herman D. Ruhm; *Director for Kentucky*, Mr. John B. Atkinson.

On suggestion of the present Secretary he was instructed to extend to the American Institute of Mining Engineers an invitation to hold their October meeting of 1896 in Nashville, and to tender them the use of our rooms.

The retiring President delivered his annual address on the subject, "Development of Technical Education in the United States," of which a brief synopsis follows. He referred to the series of articles which had appeared in the *Engineering News*, giving valuable statistics on the subject, of which, he said, he had freely made use:

The first school in the United States to give a course in engineering was the United States Military Academy at West Point. The first two students who graduated as engineers graduated there in 1802. The Military Academy continued to graduate the only engineers in this country until 1840, when the Rensselaer Polytechnic Institute graduated its first class of thirteen civil engineers, being

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the first graduates in civil engineering in any English-speaking country. The Rensselaer Polytechnic Institute was founded in 1824 by Stephen Van Rensselaer as a "School of Theoretical and Applied Science." In 1849 it was reorganized as a general polytechnic institute, and it still devotes itself to civil engineering, dividing the course into general and sanitary engineering.

The total number of engineering schools or the schools giving engineering degrees, in 1889 was ninety-four.

Previous to 1802 engineers were self-taught, and from 1802 they were either trained in the office of some engineer or graduated at West Point.

Until recently in New England and at present in old England, "students" or pupils were apprenticed — so to speak — to practicing engineers. This custom, however, has never prevailed to any very great extent in the West. No articles were signed by the "pupil," but he was supposed to pay $100 per year for three years to the engineer in whose office he was serving, and he was paid twelve and one-half cents per hour for his work in the field, which was credited on his tuition account. "After the war," this system began to die out, and the pupil was paid twelve and one-half cents for his office-work, as well as field-work, and in this way he could frequently more than pay his tuition. This, however, did not cause any loss to his "instructor," because his services were charged at a rate of from $2 to $6 per day, according to the skill of the pupil. By this system the pupil learned much or little, as he chose. He asked such questions as he pleased, and got such answers as he could, but what he learned he usually learned well, because he put into practice immediately and constantly what he learned.

Up to 1830 the word "engineer" conveyed to the minds of the vast majority only the idea of a military officer. The phrase "civil engineer" had been but lately coined. In 1828 the Institution of Civil Engineers was incorporated in England, and when civilians assumed the title they incurred the wrath of the military men. In 1835 the Rensselaer Institute first resolved to form a distinct "Engineer Corps," receiving on graduation the "Rensselaer Degree of Civil Engineer." As we have seen, their first class graduated in 1840.

The School of Engineering of Union College at Schenectady, N. Y., founded in 1845, was the second in the United States. The third was the Lawrence Scientific School at Harvard, founded in 1846. The fourth, the Sheffield Scientific School at Yale, founded in 1847, nominally, but was not a live and active school until 1861. The fifth was the Engineering Department of the University of Michigan, founded in 1852. The sixth, the Brooklyn Polytechnic Institute, founded nominally in 1845, but did not begin graduating until 1866. The Columbia College School of Mines was founded in 1863 and opened in 1864. It was the first school in the United States in which mining was taught as a science. Here the college course in Mining Engineering started in the United States.

The Massachusetts Institute of Technology was incorporated in 1861 and began operations in 1865. In 1868 the first class, composed of thirteen, graduated.

The first degrees in Mechanical Engineering were conferred in 1868 by three institutions — Rensselaer conferring five, Yale one and Massachusetts Institute of Technology one.

Stevens' Institute was founded in 1870; its electrical course was instituted in 1880. Sibley College, Cornell, was also founded in 1870. The first Civil Engineering degree was given in 1871. In 1875 the course in Electrical Engineering was instituted, as well as a course in Marine Engineering.

The latest course in engineering is Chemical Engineering, which is given at the Massachusetts Institute of Technology.

After thanks from the retiring President for the honor conferred upon him, and his expression of best wishes for, and interest in, the Association, and the passage of a vote of thanks to him for his excellent and instructive address, and to all the retiring officers for their zeal and faithful discharge of their duties, the Association adjourned.

Members and their friends will take a trip to Atlanta on the 12th inst., and the next meeting will be held there.

LUCIUS P. BROWN, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

WEST ENTRANCE TO WESTMORELAND PLACE, ST. LOUIS, MO. MR. T. C. LINK, ARCHITECT, ST. LOUIS, MO.

[Heliochrome issued with the International and Imperial Editions only.]

THE CLOISTER: MONT ST. MICHEL, NORMANDY, FRANCE.

NOT the least interesting and by far the most beautiful portion of that singular fortress, monastery, asylum that used to lie in mid-sea off the coast of Normandy is this cloister which practically rests on the top of the living rock and beneath which lies the famous Salle des Chevaliers, which has below itself the equally well-known subterranean crypt. The cloister was finished in 1228 by Raoul de Villedieu. It measures 14m. x 25m. and its vaulting is supported by 220 columns, most of which are of granite, so disposed as to give but seventy openings on the atrium. The windows which open to the west are more than three hundred feet above the waves that wash the foot of this portion of the structure which is known as "La Merveille."

THE CLOISTER OF SAN MARTINO, NAPLES, ITALY.

THE Carthusian Monastery of San Martino, which was begun by Duke Charles, of Calabria, in 1325 and wholly rebuilt in the seventeenth century, is now used as a show place and museum, under the control of the Museo Nazionale. The arcading of the cloister is carried on sixty white marble columns.

CLOISTER OF SAN ZENO MAGGIORE, VERONA, ITALY.

THIS cloister, which adjoins the famous twelfth and thirteenth century church, is utilized as a museum for Christian antiquities.

CLOISTER OF ST. TROPHIME, ARLES, FRANCE.

CLOISTER IN THE MUSEUM, TOULOUSE, FRANCE.

CLOISTER, FONTFROIDE, FRANCE.

FOUR TOMBS IN A CHURCHYARD AT HIRSCHBERG, SILESIA.

SEE article "A Churchyard of Palaces," elsewhere in this issue.

[Additional Illustrations in the International Edition.]

WEST ENTRANCE TO VANDEVENTER PLACE, ST. LOUIS, MO. MESSRS. STEWART, MCCLURE & MULLGARDT, ARCHITECTS, ST. LOUIS, MO.

[Gelatine Print.]

EAST ENTRANCE TO WESTMORELAND PLACE, ST. LOUIS, MO. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.

[Gelatine Print.]

THE BANK OF BOLTON, LIMITED, BOLTON, ENG. MESSRS. BRADSHAW & GASS, ARCHITECTS.

EXHIBITIONS

ATLANTA, GA. — *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS. — *Paintings recently purchased; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St.

Pictures by William Adam: at the Boston Art Club, December 16 to 23.

Water-color Exhibition: at the Unity Art Club, 711 Boylston St., December 10 to 24.

Paintings by Wilton Lockwood: at the St. Botolph Club, December 2 to 21.

CHICAGO, ILL. — *Paintings by Glasgow and Danish Artists:* at the Art Institute, November 19 to December 22.

Paintings by the Chicago Palette Club and Chicago Art Students League: at the Art Institute, December 12 to 29.

NEW YORK, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Fourteenth Autumn Exhibition of the National Academy of Design: December 23 to January 11.

R. Caton Woodville's "1815": at the Schaus Gallery, 204 Fifth Ave.

Pastel Portraits by J. Wells Champney: at the Knoedler Gallery, 170 Fifth Ave.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South.

Drawings by George du Maurier: at Wunderlich & Co.'s Gallery, 868 Broadway, November 23 to December 21.

PHILADELPHIA, PA. — *Sixty-fifth Annual Exhibition of the Pennsylvania Academy of Fine Arts:* opens December 23, closes February 22. The Architectural Section of the Exhibition closes February 1.

SPRINGFIELD, MASS. — *First Annual Exhibition of Society of Springfield Artists:* at Rude's Gallery, December 4 to 25.

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NOTES AND CLIPPINGS

The Diamond Shoal Lighthouse. — A difficult and costly piece of engineering has been undertaken by the United States Government in the projected establishment of a great light-house in the open ocean off Diamond Shoal, seven miles from the present Hatteras Light and bearing almost due east. This is one of the most daring schemes that Army officers have dealt with since General Casey, chief of engineers, successfully undermined the great Washington monument and placed there a solid foundation expected to support that structure for ages to come. Surrounding this new plan, however, there is foreboding of failure, and it is predicted thus early that $1,000,000 is to be sunk literally as well as metaphorically in the sea. If such a structure is placed there and stands without serious damage the onslaught of the seas for five years, according to a leading army engineer, this Government will have accomplished its greatest triumph in this branch of science. The height of the focal plane above water in the prospectus is given as 100 feet, and the structure is to stand in 33 feet of water and to be supported on disc piles sunk to a depth of 30 feet in the sand. The diameter from centre to centre of vertical members of the foundation series is to be 60 feet, and the height of the floor of the house above water 47 feet. The main portion of the structure is to be constructed of forged steel members, with principal joints and connections formed of steel castings. A special feature of the design is to make all essential parts below the water-line of massive dimensions, as well as all those parts above the water-line which will be subject to the action of wind and waves. The use of bolts, keys, screws and other small sections or dimensions which would be rapidly weakened by corrosion, will be avoided as far as possible. Joints and connections are to be made absolutely rigid to all possible strains and to be as strong as the members themselves. This is to be effected by joining ends of members to steel cast hubs by the use of massive steel rings shrunk on in a manner approximating that followed in "built-up" gun construction. In the foundation series, besides the massive members necessary for the strength of the tower when in place, there will be certain other tie-rods of lighter section, which are added for greater security to stiffen the framework while it is floated and while being placed and grounded on the shoal. It is proposed by the Board to construct the screw-pile structure in the harbor and float it out by steel cylindrical caissons calculated to give a draught of 30 feet when at sea. This part of the light is then to be sunk probably 50 feet down in the bottom by hydraulics, until a firm hold is secured. It is then proposed to build up from the skeleton arrangement until the lightkeeper's apartments have been completed and the height secured for the great lens which is to throw its light 25 miles in all directions. The work is to begin this winter, and it is proposed to complete the light in two or three years. — *Washington Times.*

Solidified-oil Fuel. — According to the Leeds *Mercury*, M. Paul d'Humy, a French naval engineer living in Liverpool, has succeeded in converting petroleum and other oils into a hard, homogeneous mass, suitable for use as fuel on board war-ships and other large ocean-going boats. He claims that this material is affected neither by heat nor cold, and is absolutely smokeless and odorless. The cakes, he says, when set on fire, burn only on the surface, and give off an intense heat. They can be made in any size or shape, and can be stored anywhere without danger, as they cannot evaporate or cause an explosion. They require very little draught, and make not more than from 2 to 3 per cent of ashes. M. d'Humy declares that a man-of-war having 1,000 tons of this solidified oil could sail round the world, or remain at sea for months together. A ton of his fuel, M. d'Humy says, represents at least thirty tons of coal, and the cost is not more than from $5 to $10 per ton. In the manufacture of steel, he says, five hundredweight of solidified petroleum, costing 6s., would melt a ton of metal. The new fuel can also be used with perfect safety for domestic purposes. If the half of this story is true, and M. d'Humy really has got a substitute for coal, which is less dirty, bulky and costly, while equally safe and powerful, he has opened the way to all sorts of marine possibilities. But discoveries of this kind have been made, on paper, a good many times before, and it will be well to await results before growing enthusiastic. — *N. Y. Evening Post.*

Fake Proposals Illegal. — Some property-owners in St. Louis have evaded payment of assessment for street-paving by a novel proceeding at law. The ordinance under which the pavement was laid required that it be of Lake Trinidad asphalt. One paving company has a monopoly of this kind of asphalt and, consequently, as the protesting citizens pointed out, the ordinance was in violation of the city charter, which provides that all contracts be let to the "lowest responsible bidder." The contention was sustained by the Supreme Court of the State, which used strong language in condemnation of monopoly contracts. "To advertise," the Court said, "for sealed proposals when there can be but one bidder, to open them in open session, to examine and publicly declare them, and thereupon to award the work to the lowest responsible bidder, when there is and can be but one, would be to play as broad a farce as was ever enacted behind the footlights. The law does not permit itself to be thus trifled with, nor allow its ministers to thus substitute pretence for performance." Under the decision the entire cost of the pavement in question must be paid by the city out of general taxation. — *Boston Transcript.*

Another Wren Building in Peril. — It is gratifying to the archæological instinct to find that the proposals of the Trinity Brethren to pull down a fine Wren building in the East End has become one of the leading topics of the day for the London press. The London spirit is not always so vigilant or so wisely conservative as in this instance. This time it has proclaimed itself at the eleventh hour, but still when there is a chance of stopping the ruinous work. The building condemned by the Trinity Brethren has been in use as a hospital for pensioned seamen and their wives since the days of James II. It is a beautiful and most characteristic bit of architecture, yet the Trinity House thinks it may very well make way for a brewery which covets the site. Sir Walter Besant is leading the outcry against this vandalism. It can hardly be doubted it will be loud enough to save the almshouses. The plea of the Trinity Brethren is childish. It is that the London County Council requires that the drains shall be put in order, and that they have no funds with which to do the work. This was at first understood to mean that the building was in a thoroughly insanitary condition, and that the only practical way of dealing with it was to pull it down. It turns out, however, that the inspectors' demands go no farther than the expenditure of £150. If the impecunious brethren cannot find that sum out of their £300,000 a year, it is to be presented to them by public subscription. — *The Scotsman.*

Vastness of Blenheim. — In the new home of the new Duchess of Marlborough there are said to be twenty staircases leading from the main floor to the second. And so complicated is the arrangement of the rooms that people can visit for weeks without ever meeting each other except at dinner. It is said that a former Duke, famed for hospitality, was frequently imposed upon by scapegraces of good family, who would put up at Blenheim for weeks at a time, dining princely, using the horses in the stable, and occupying with valet a good suite of rooms, and all without the master's knowledge. So vast is Blenheim. — *Westminster Gazette.*

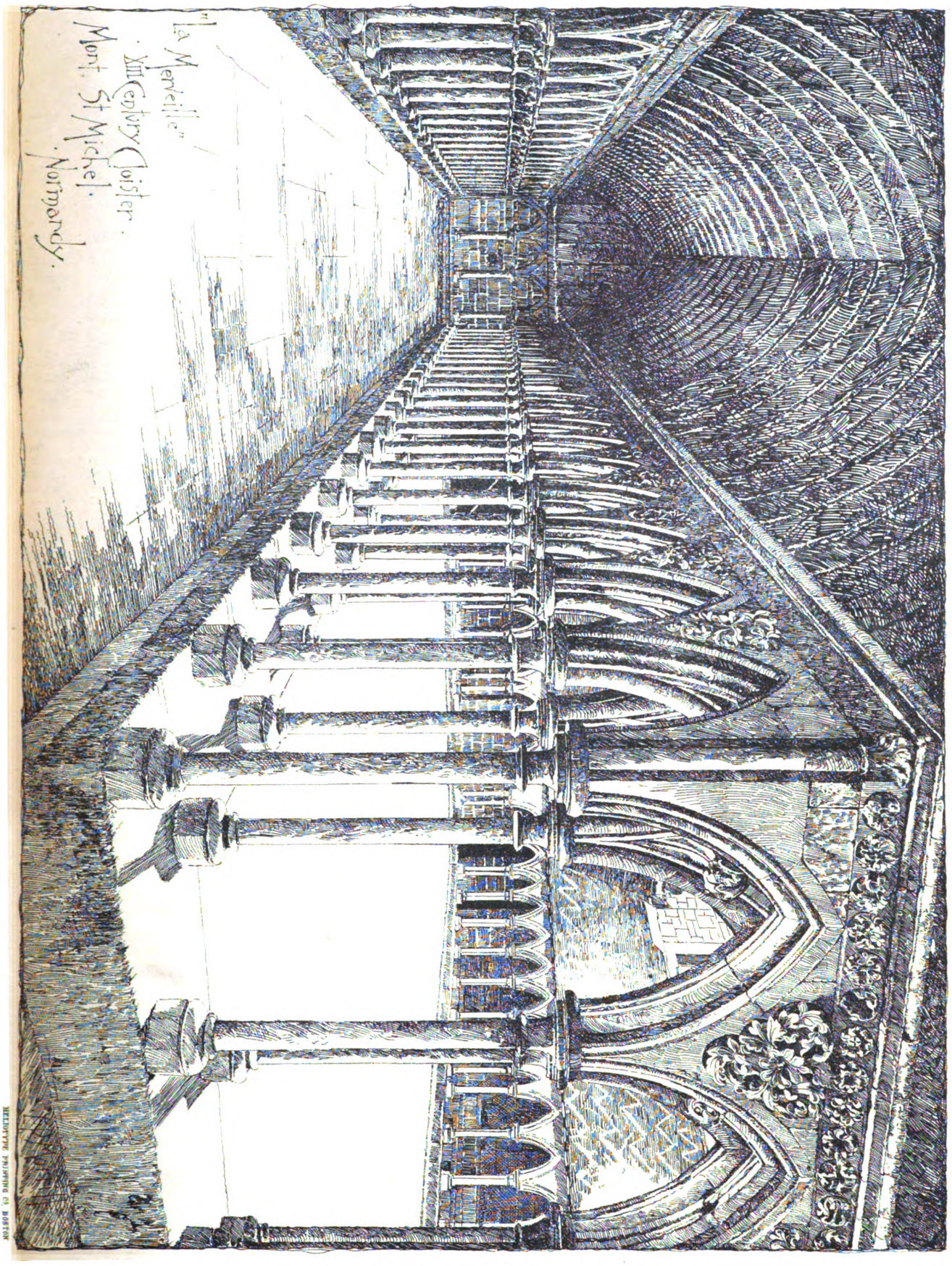
Deflecting a River to the Opposite Watershed. — Another wonderful engineering work has just been completed in India, which practically compels a river which formerly entered the sea on the western side of India to reverse its course, to pierce its way through the lofty central watershed, and flow down to the eastern coast, thus affording irrigation to a vast and arid region in which famines have been common for centuries. This territory extended from the central watershed eastward to the Bay of Bengal. It occurred to an officer of the Madras Engineers, Capt. Caldwell, in 1803, that it might be possible to divert one of the western rivers, near its source in the hills, towards the east. The most important of those western-flowing rivers, the Periyar — literally, "The Big River" — rose not far from a headwater of the Vaigai River, which runs southeastwards into the Bay of Bengal. But while the Periyar deluged the western coaststrip with destructive floods, the Vaigai was almost completely exhausted on its course through the dry regions east of the watershed. Capt. Caldwell's project was again brought forward in 1867 by another officer of the Madras Engineers, Major Ryves, and complete plans for diverting the waters of the Periyar into the Vaigai were drawn up. These included an enormous dam to close the valley of the Periyar, a vast reservoir to hold the waters thus collected, and the driving of a broad tunnel, nearly 7,000 feet long, to convey the overflow through the ridge to the dry channel of the Vaigai River. This huge work has just been finished at a total cost of about $2,500,000. — *N. Y. Evening Post.*

The Shrinkage of Iron. — The action of fluid cast-iron in the mould is somewhat curious. When poured into a mould in a state of fluidity, cast-iron, and especially what is known technically as "very gray," expands at the moment of solidification, thus giving a sharp impression in the mould. The expansion, slight but very noticeable, extends until in the process of cooling the iron attains the stage of red heat. Contraction then takes place with the result that the cooled iron is noticeably smaller than the mould. In making patterns for iron castings, therefore, pattern-makers commonly allow about one-eighth of an inch per foot for shrinkage. The shrinkage in castings, however, is by no means a constant quality, but varies materially with the proportion existent in the pattern and the character of the metal used — as much as one-tenth of an inch per foot being allowed when casting beams and only one-thirty-second of an inch with large cylinders. When any metal in a fluid state is poured into a cold mould, solidification commences at the outside. As the cooling is continued, the castings, therefore, would consist of a rigid outside envelope containing a soft interior. If, therefore, the condition of a small piece of such metal in the centre of a square be considered during cooling, it will be seen that the contracting force existing on each side of the square will be the same. A cube or sphere of cast-iron contracts in cooling in a uniform manner throughout its mass. If two squares be placed side by side, forming a rectangle, on each half of the sides, the contracting forces are as before, but on the ends, there being no rigid division between the two squares, both parts exert a unit of contracting force. The result is that the contracting force of the ends is equal to that of the sides, or, on a unit of length the contracting forces are double as great on the ends as on the sides. In casting, therefore, thin strips, the shrinkage of the length is very great, while in the thickness it is scarcely appreciable. A square plate shrinks little in thickness, but equally in width and breadth; a flat disc shrinks little in thickness, but equally in all diameters. A thin ring shrinks more in diameter than a thick one, and so on. When it is known that iron with different shrinkage from that generally employed is to be used in a foundry, the patterns are altered to meet the changed conditions. Silicon, unless in excessive quantities, gives a gray, soft iron which has the minimum shrinkage. In many cases a judicious mixture of iron will give the desired result without extra expense in pattern making. Charcoal iron has usually a higher melting-point than that of less pure iron made with coke. It sets more quickly in the mould and contracts more, so that an extra allowance for shrinkage must be made in all patterns employed. It will be seen from the above that pattern-makers require special technical skill as well as knowledge of the iron to be used in casting for their patterns. There are few employments which require greater specialized knowledge of rather a wide range than that of pattern making. — *Invention.*

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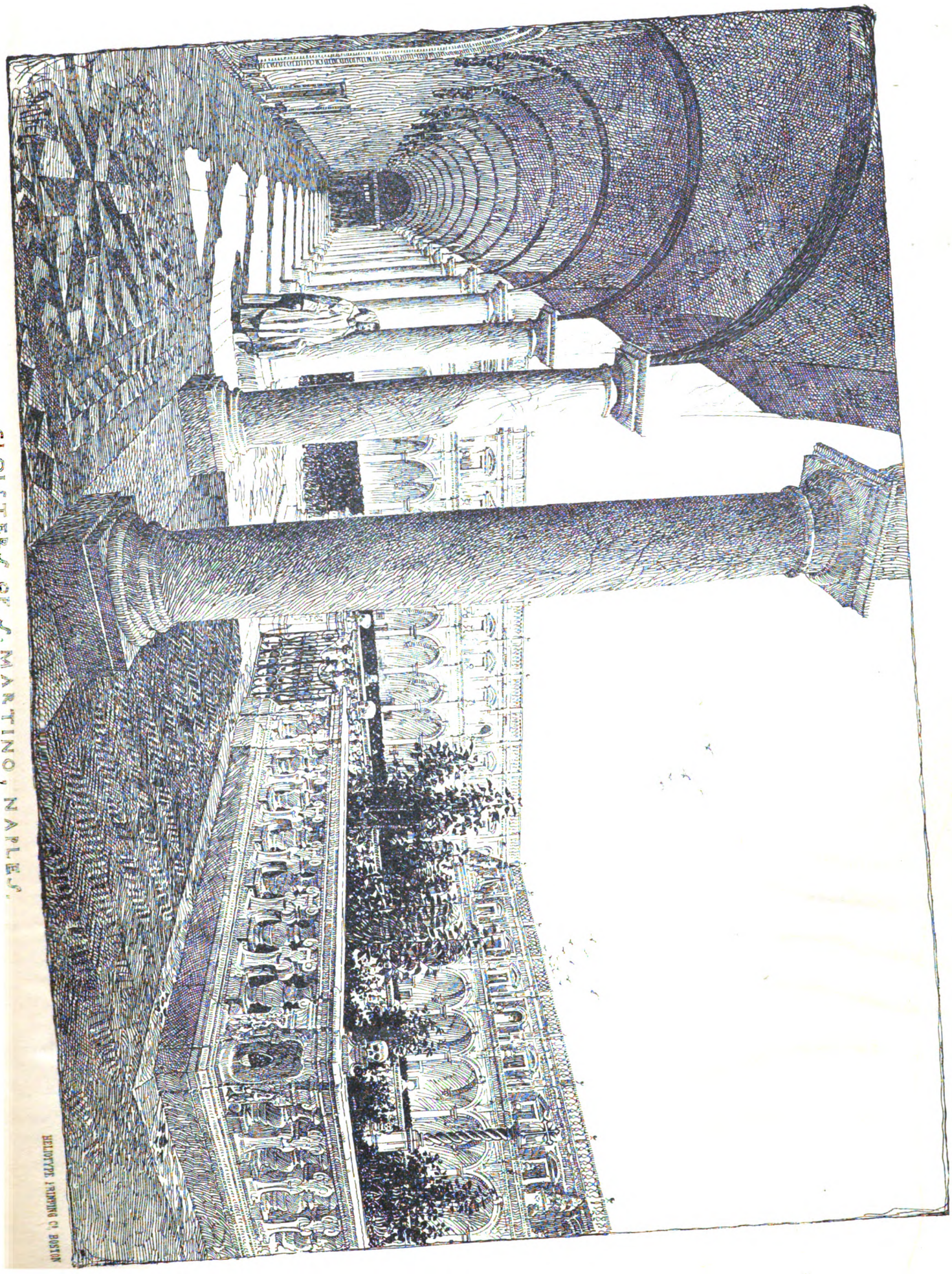


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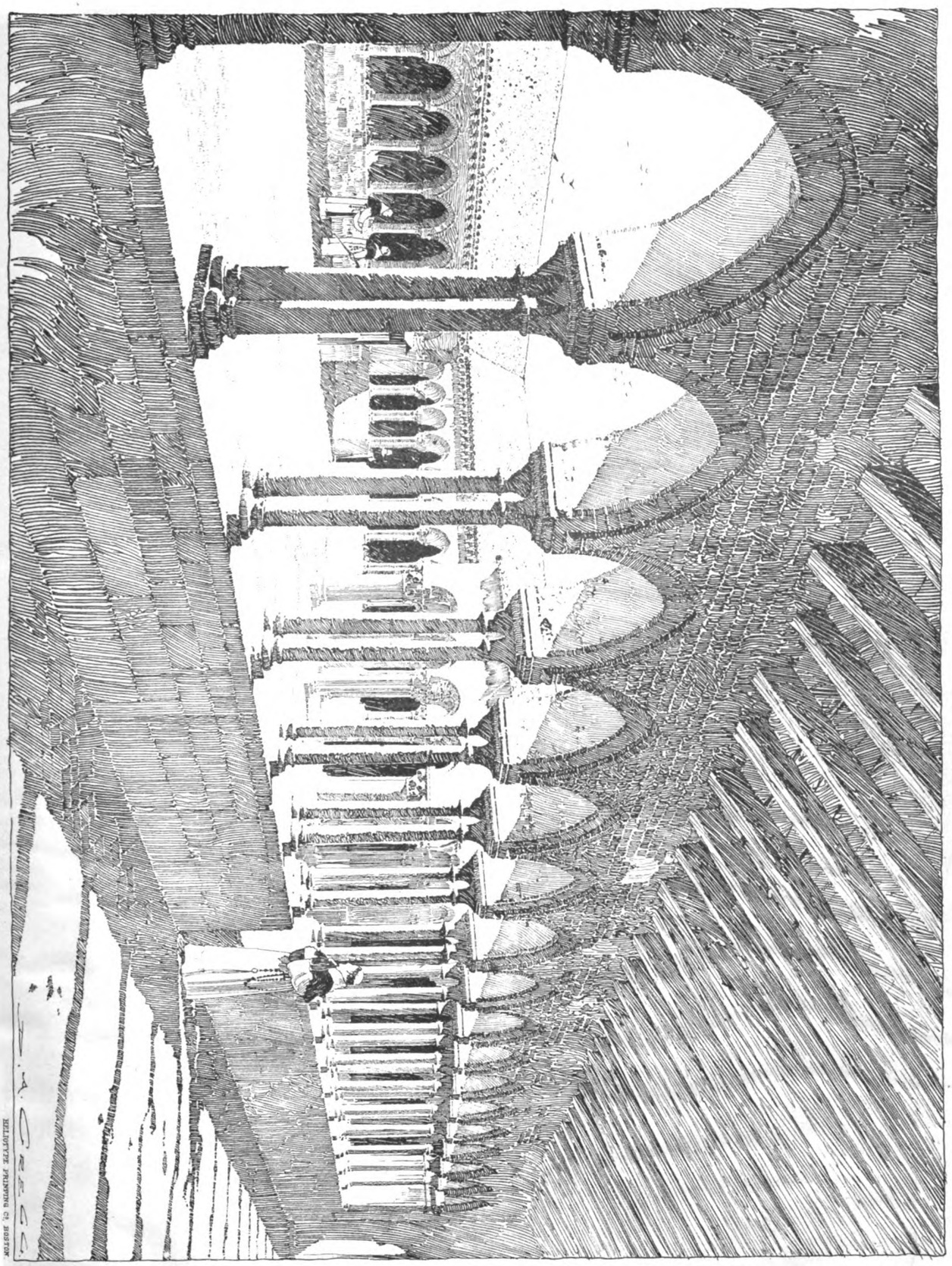
CLOISTERS OF S. MARTINO, NAPLES.

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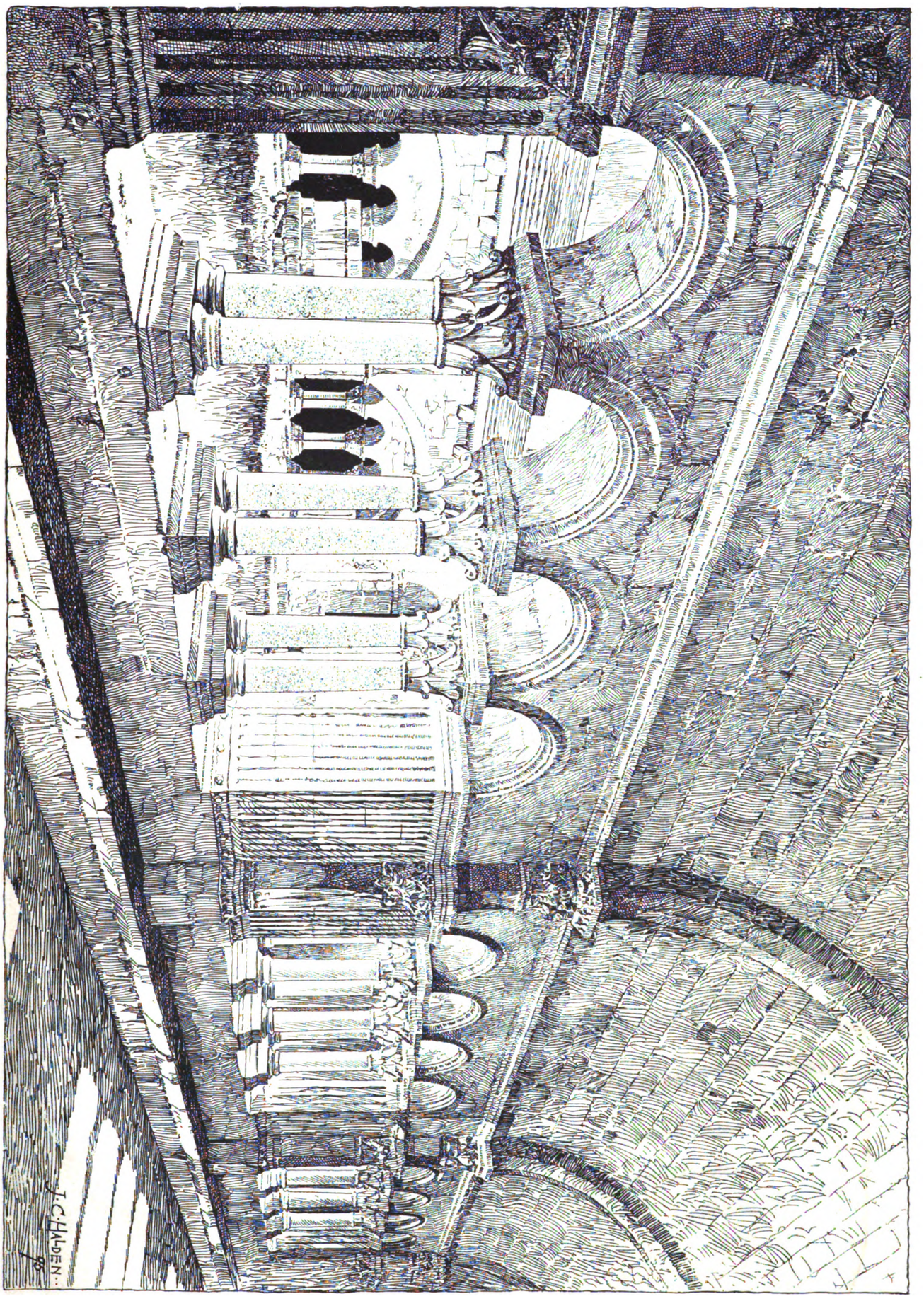


CLOISTER OF S. ZENO MAGGIORE, VERONA.
X-XII CENTURIES.

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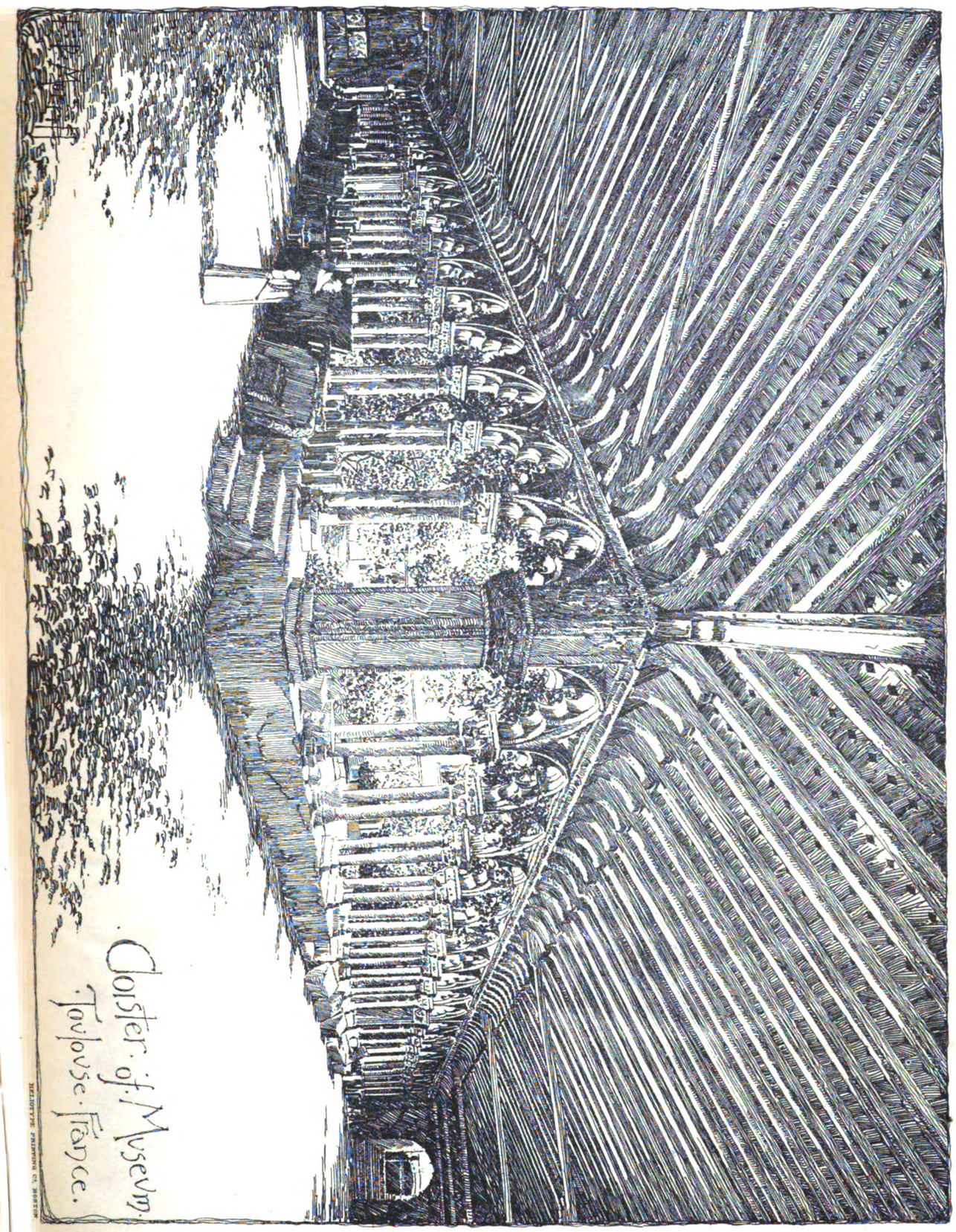
CLOISTER OF ST. TROPHIME AT ARLES, FRANCE.

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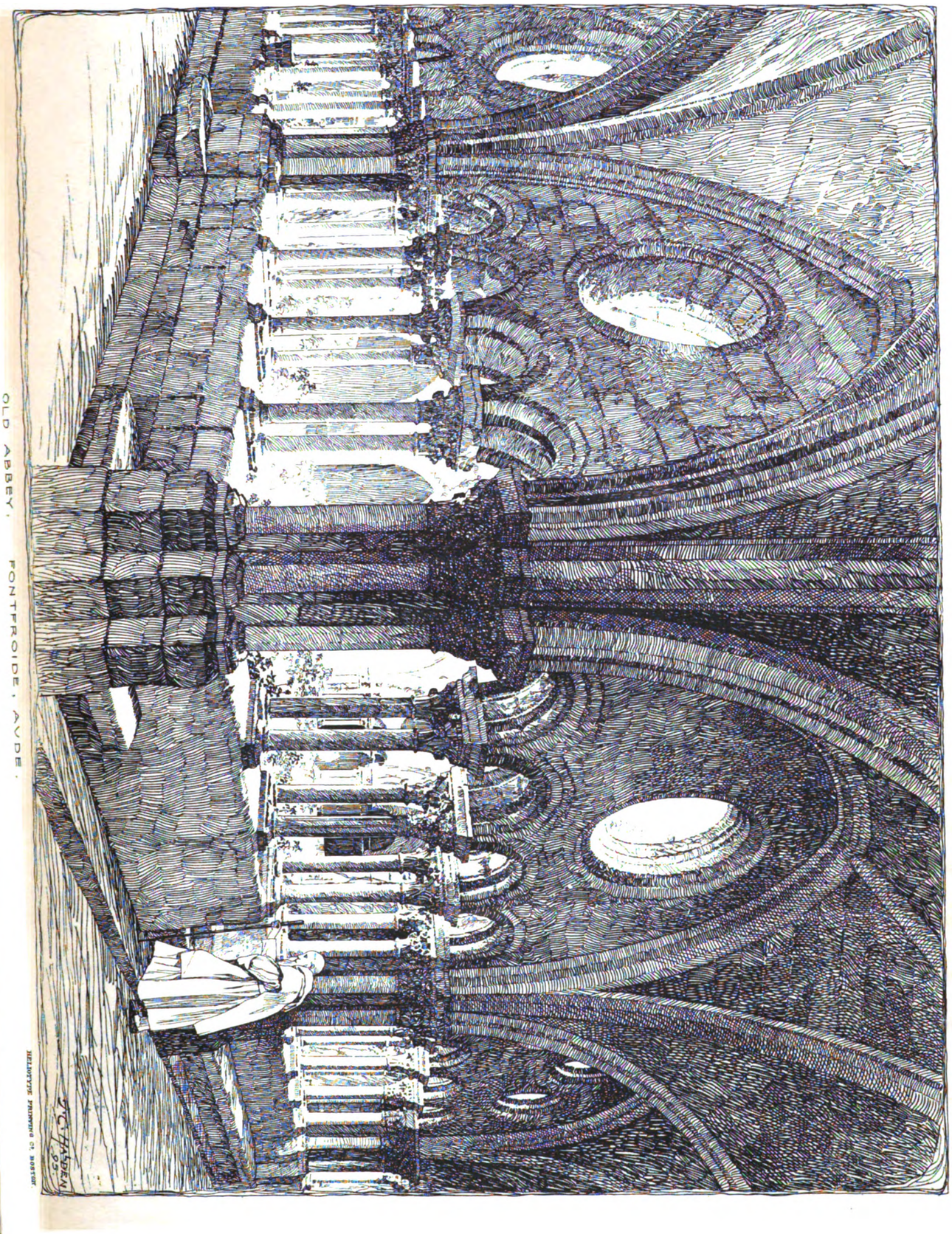
Cloister of St. Musevm.
Toulouse. France.

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OLD ABBEY, FONTFROIDE, AUDE.

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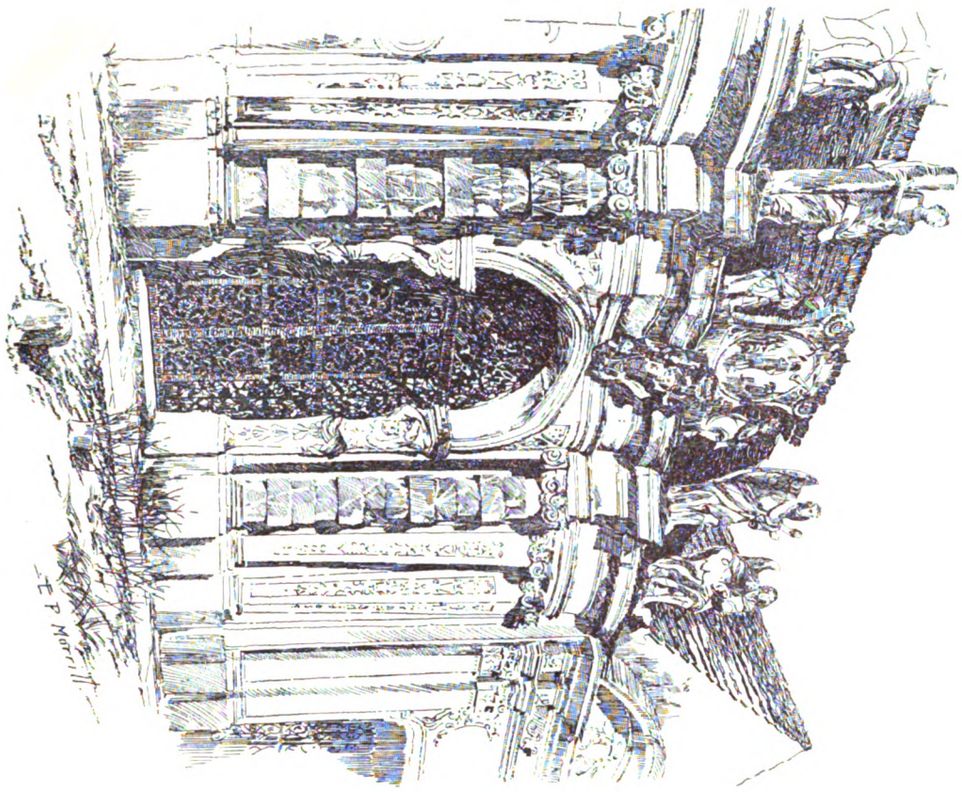


Fig. 1. Tomb of the von Schweinichen Family, Hirschberg, Silesia.

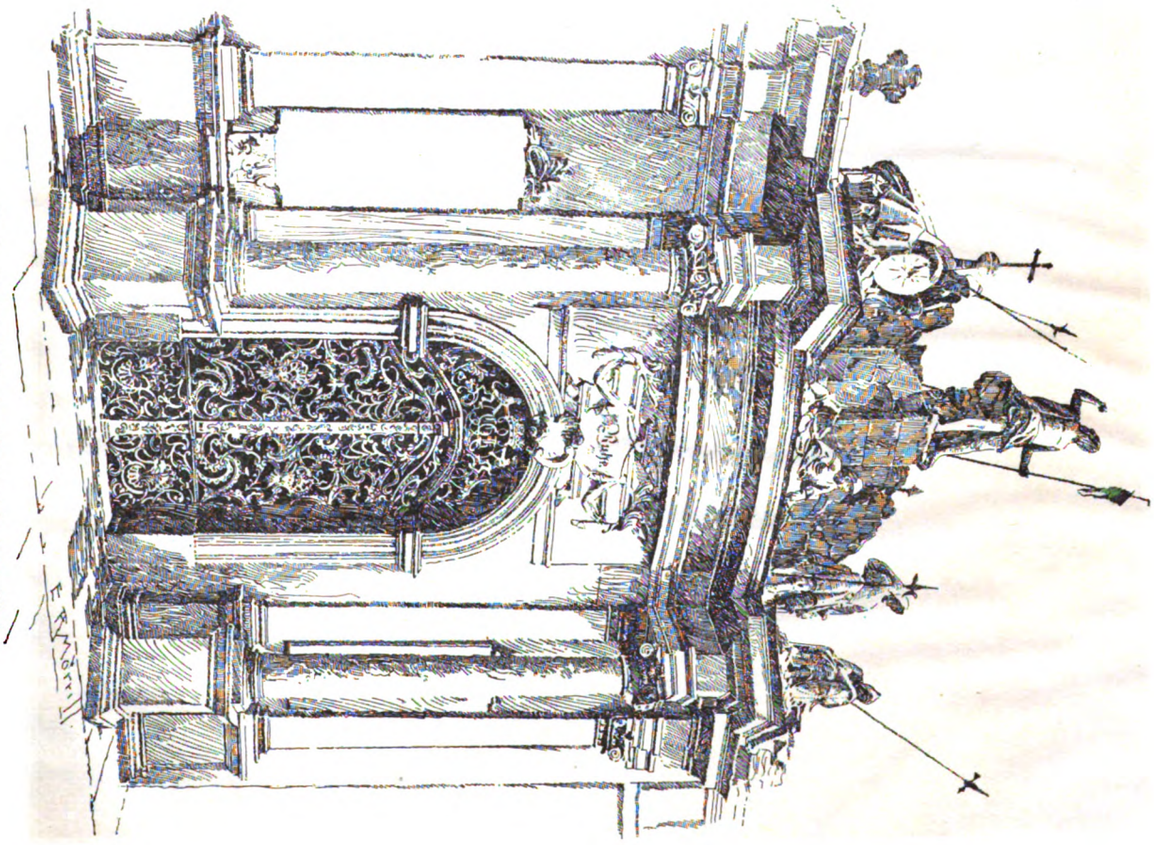


Fig. 2. Tomb of the Merchant Kosche, Hirschberg, Silesia.

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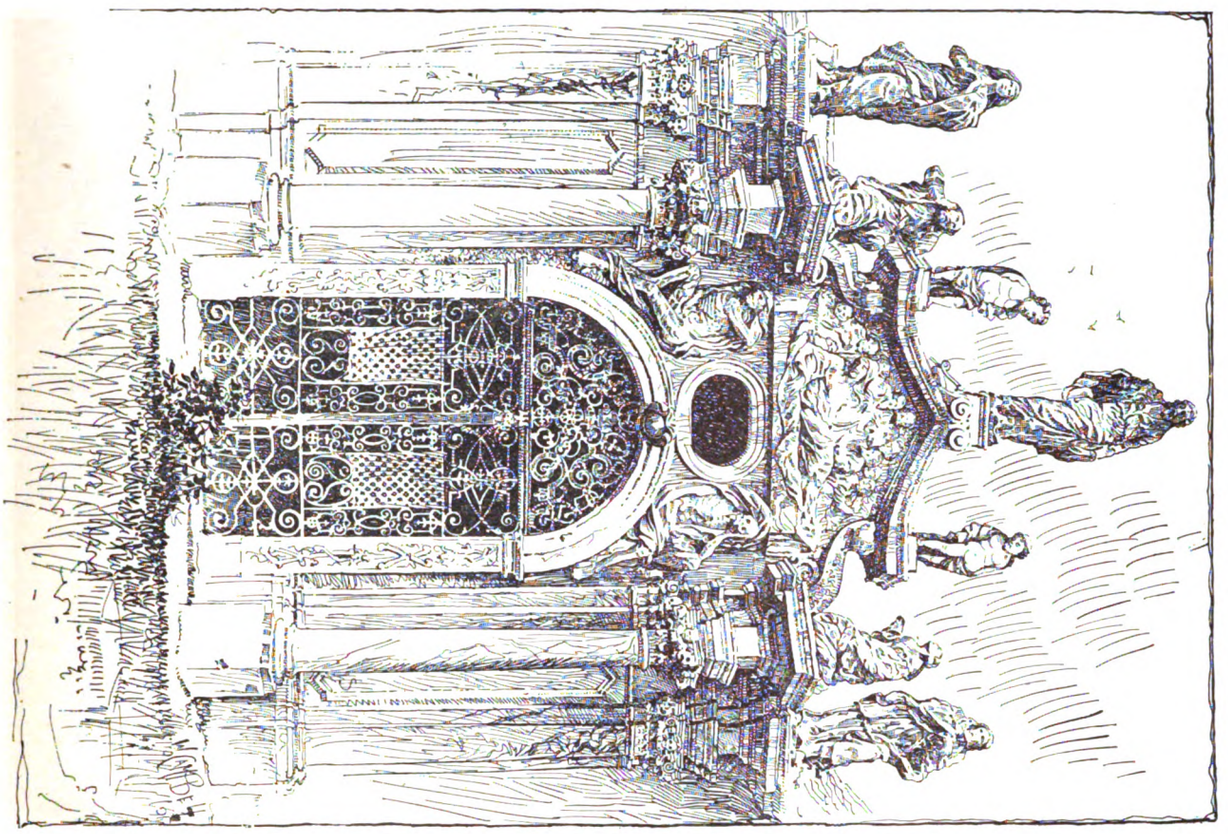


Fig. 3. Tomb of Justice Hess, Hirschberg, Silesia.

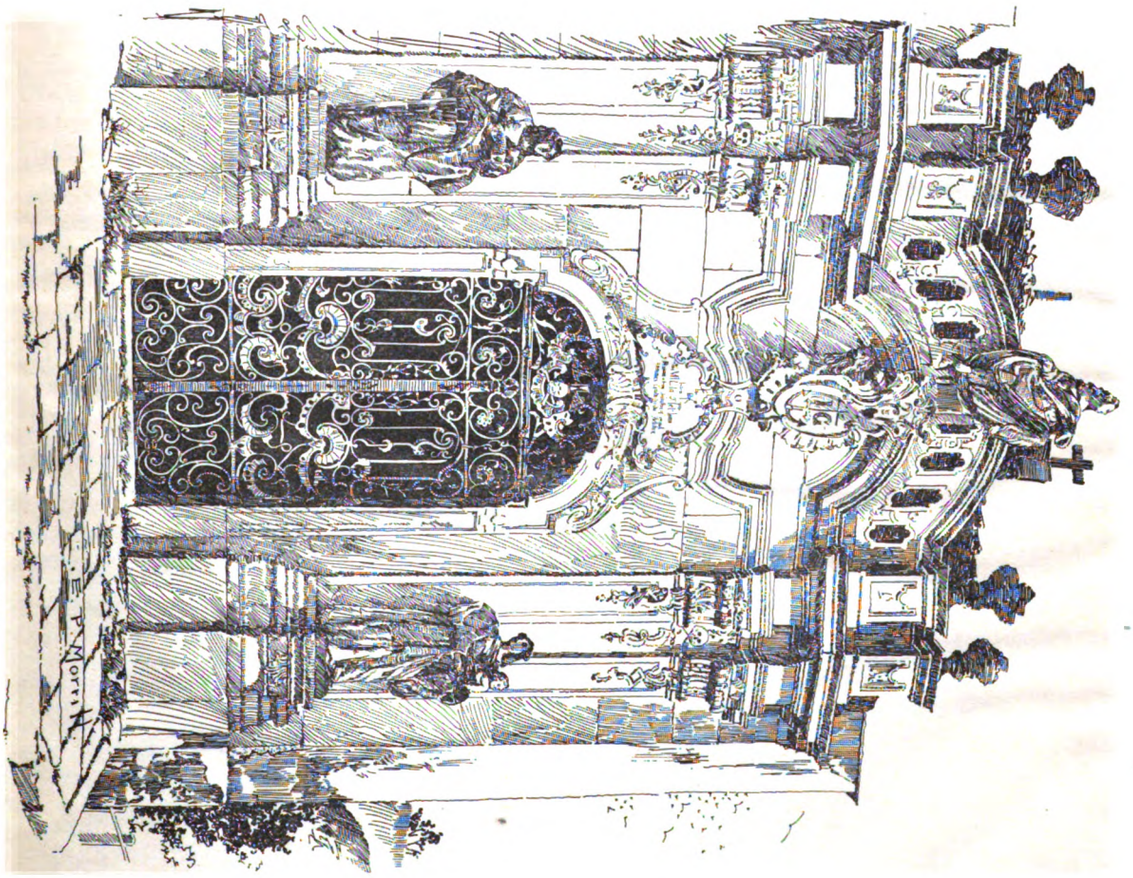


Fig. 4. Tomb of Judge Titze, Hirschberg, Silesia.

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DECEMBER 28, 1895.

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MR. CHARLES B. ATWOOD, well known as the architect of the Peristyle, the Fine-Art Building, and the Terminal Station at the Chicago Exposition, and as the designer of many other fine buildings, died last week in Chicago. Mr. Atwood was born in Charlestown, Mass., in 1849. He received his professional education at the Lawrence Scientific School of Harvard University, and in the office of Messrs. Ware & Van Brunt, of Boston, and soon became locally known as a very skilful and rapid draughtsman and designer. He established himself in business on his own account in Boston in 1872, and built several important structures in and about Worcester, Mass., where his family then lived. Three years later, he was engaged by the noted firm of Herter Brothers, in New York, to take charge of the architectural part of their work; and, in connection with them, designed most of the detail for the W. H. Vanderbilt mansions in New York, and for several other fine houses. Later, he was engaged on his own account to design and build the two beautiful houses which Mr. Vanderbilt presented to his daughters, Mrs. Twombley and Mrs. Webb. His facility in architectural design naturally led him to take part in many competitions, in which he won a large number of prizes, and a wide reputation in the profession. He was early chosen designer-in-chief to the Columbian Exposition, and, in that capacity, turned out in a short time an immense amount of work, all of which was more than creditable, while some portions, such, for example, as the Peristyle and the Art Building, were among the most brilliant architectural achievements of the Exposition. Work of such high character and very real merit could not be turned out by one who was merely a rapid, facile and brilliant draughtsman; it could only be accomplished by one who to the inborn instinct and delicate perception of the artist had added the tedious and thorough training of the fastidious scholar. Those who knew Atwood merely as a lovable companion, who had the failings of an artistic and somewhat erratic temperament, hardly realized that he devoted much time to the serious study of his profession in its higher reaches; that in the early years when he often was out of work and discouraged he still pursued his studies and took advantage of enforced idleness to improve his knowledge and increase his skill. This unsuspected industry met its reward not only when he found himself fully ready to take advantage of the signal opportunity at the World's Fair, which the death of Mr. Root placed in his reach, but also on an earlier occasion. During one of his idle times he had made a careful study of the New York City-hall and had measured, sketched and drawn it all out so that he had acquired a familiar knowledge of it and a thorough appreciation of its spirit considering at the same time the possibility of altering and enlarging it. Returning one day after a prolonged absence from the city he learned that the first competition for the new city-hall would close the next day. He at once set to work and within less than twenty-four hours had produced with his own hands the full set of drawings — with one exception — that the conditions required. When the experts examined the drawings submitted, it was found that Atwood's scheme must, under the conditions, be ruled out because of its incompleteness; but as it was really superior to the design of any other competitor, they recommended that he should be given a special prize and be invited to complete his drawings, and this was done.

ONE cannot help pondering a little the question whether Fine-Arts Federations, and such bodies, do not occasionally, by their well-meant efforts, arouse a resentment which defeats the object that they had in view, and which might have been obtained by influences less obtrusive than those which they wield. Our readers know that the City of New York proposes to erect a monument to the memory of the soldiers and sailors of that city who suffered in the Civil War which ended some thirty years ago. Although New York has certainly not been over-hasty in making up its mind to this act of piety, it proposes now to carry out its plans on a magnificent scale, and, naturally, the first thing is to determine the sort of monument to be built; while the second is to decide where to build it. In regard to the first question, the commission of the municipal government came some time ago to the conclusion that an obelisk, or lofty shaft of some sort, would be the best form to adopt. For a site, the Plaza, at the Fifth Avenue entrance to the Central Park, was understood to be favored by the Commission; but the latter, very politely, invited the Fine-Arts Federation to consider the matter, and report, before the final decision should be made. The Federation accepted the invitation, and examined with assiduous care about a dozen possible sites for such a monument. It came to the conclusion that the Plaza site would be perhaps the worst that could be chosen, the space being small, overcrowded, at certain hours, with carriages, the circulation of which would certainly not be facilitated by the insertion of a huge mass of masonry in the middle; and overshadowed by enormous hotels, fifteen or twenty stories high, which would dwarf any shaft of dimensions inferior to those of the Washington Monument. Moreover, as the Plaza is low, the ground rising from it in three directions, the advantage which natural conformation can give to such a structure would be lost. Instead of this, the Federation came to the conclusion that the space at the junction of the Riverside Drive with West Seventy-second Street would furnish the best location. This place is situated on a high bluff, overlooking the Hudson River, and a monument on it would be visible from Staten Island to Irvington, and, on the Jersey side, as far as Elizabeth. At the other end of the Drive is the Grant Monument, and there would be peculiar fitness in devoting this splendid street, perhaps the finest city street in the world, in this way to the memory of the struggle which led to the final consolidation of the great nation of which New York is the metropolis. These considerations were weighed by the Federation, and duly set forth in the report made by its committee, representing the Society of Mural Painters, the American Fine Arts Society, the National Academy of Design, the National Sculpture Society, the Society of American Artists, the Architectural League, the Society of Beaux-Arts Architects, the New York Chapter of the American Institute of Architects, and the Municipal Art Society; but the Commission, after hearing the report read, quietly took a vote, which resulted in the selection of the Plaza site, only one of the Commissioners, Recorder Goff, voting against it.

OF course, the Commissioners of the city are sensible men, and wish to do the best they can in the matter; but Americans are not noted for the enthusiasm with which they receive advice from people who profess to know more than they do about anything, and it is not likely that the representations of the Federation received much consideration. On the face of the matter, it cannot be denied that the Plaza

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would attract a layman more than the Riverside site. While the Plaza swarms all day long with people, who could not fail to see a monument in the middle, even if they were fortunate enough not to come into collision with it, the Riverside Drive is, at present, undeniably lonesome. While its position, winding, as it does, for about two miles along the Hudson, high above it, and overlooking it from Tarrytown to the sea, gives it a romantic grandeur which no other city street possesses, and which every artist feels, it is far from the elevated railways and the dry-goods stores, and has always, on that account, been regarded with a certain disfavor among the people generally. It is not unnatural that the Commissioners should not have received with enthusiasm the idea of placing their monument there; but there is no doubt that the Federation, looking forward to the time, which will surely come, when the Drive will be lined with palaces, took the wiser view.

MR. ALDRICH, Representative to Congress, from Illinois, has introduced a bill in relation to the designing of public buildings, agreeing substantially with the McKaig bill, which failed of passage last winter. Mr. Aldrich was formerly Commissioner of Public Works for the City of Chicago, and his experience with the carrying-out of important works of construction ought to make his opinion in favor of the bill of great weight in Congress. We will publish next week the full text of the bill as introduced by Mr. Aldrich, and commend it to the careful study of our readers.

ONE of the victims of the persecutions of walking-delegates has taken the unusual step of appealing to the New York Grand Jury for protection. According to the *Evening Post*, which has learned his story, this man, whose name is Douglass, is a skilled carpenter, and a member in good standing of the Carpenters' Union of New York; but, for some reason, he has incurred the enmity of a walking-delegate, named Oberfield, who revenges himself by the simple process of keeping his victim out of employment, or of compelling his discharge if he happens by chance to find work anywhere. According to Douglass's account, he was, last March, foreman of the carpenters at work for Mr. Overington, the contractor in the Fidelity Building. The electric-wire men had some grievance, and struck, and a sympathetic strike of carpenters was ordered in their favor. Douglass went to the building one morning, and found that all the carpenters but five had struck. "Because," as he pathetically says, "he wanted to earn a living, and had no grievance," he kept at work. Mr. Overington then asked him to find men to take the place of the strikers, and he obeyed, collecting twenty carpenters, all union men, who were at once employed. In about a week, the walking-delegates and the builders came to an agreement, by the conditions of which the new men were to be discharged, and the strikers reinstated, but no harm was to come to the carpenters who had remained at work at the time of the strike. Douglass, as he says, was mentioned by name in the agreement, and it was provided that he should be retained as foreman.

ABOUT a week after this understanding had been reached, Oberfield and another walking-delegate called on Mr. Overington, and ordered him to discharge Douglass at once, saying that, if he did not obey, they would call out the carpenters, not only on the Fidelity Building, but on all the other buildings where he had contracts. Overington was compelled to obey, and Douglass went to the Master Workman of his union, who gave him a letter, certifying that he was a member in good standing. Douglass carried this letter to Mr. Overington, who gave him a little work to do in an outlying part of the city, and then, finding that no harm resulted, set him at work in the Hoffman House extension. Here, however, Oberfield found him, and demanded twenty-five dollars from him, as a fine for not having struck at the Fidelity Building. He paid the money, taking Oberfield's receipt for it. A few weeks later, Oberfield, accompanied by a choice band of walking-delegates, appeared at the Hoffman House, and informed Mr. Overington that all the men in the building would be called out unless he discharged Douglass at once. Again he was compelled to obey, and Douglass, after a time, found employment on a building in Harlem. Soon, however, Oberfield made his appearance, and demanded another fine, which the poor man paid, Oberfield promising that he should be molested no more. Notwithstanding this promise, he continued his persecutions, until Douglass applied to one of the city courts. The judge sent for Oberfield and "reprimanded him," naturally without effect on his proceedings, except to induce him to send his mandates through a third person, instead of delivering them himself; and Douglass now comes to the Grand Jury, to see if something cannot be devised more effective than "reprimands" in protecting him and his family in honest attempts to earn a living.

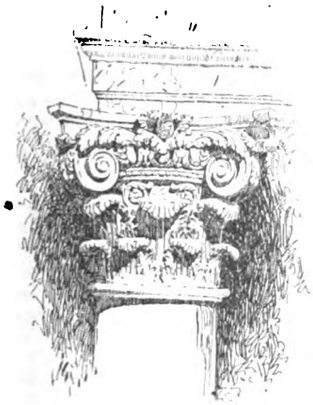
THE financial scheme for the Paris Exposition of 1900 is nearly complete, and the managers are disposed to think that the receipts will be considerably greater, and the expenses proportionally less, than at the last Exhibition. The City of Paris has agreed to contribute one-fifth of the expenses, provided that its share does not exceed twenty million francs; and provided, also, that it shall receive half the profits of the undertaking. This contribution is to be paid in five annual instalments, beginning in 1896. The general Government of France will contribute the same amount, in four instalments, beginning in 1897; and will probably advance a certain amount of money as a loan, to be repaid out of the proceeds of the private subscriptions. The latter will furnish much the largest part of the money required. At the Exposition of 1889 a large sum was raised by the sale of shares, at twenty-five francs each, the holders of which enjoyed certain reductions in the cost of admission, and travelling expenses; while they had a chance of drawing a prize in a lottery. On the present occasion, the cost of the shares will be twenty francs, but they will carry with them the same privileges of discount, and participation in a lottery, as before; and as is said, about one hundred and thirteen million francs' worth of them have already been taken, at a commission of five per cent, by the great French bankers. To our notions, the lottery attachment to these little shares is objectionable, but it has a certain practical advantage in preventing the transfer of the shares, or the railway or admission coupons belonging to them. The money raised by the subscription is to be deposited in a bank, which will pay interest on it at the rate of two and one-half per cent. This interest will be reserved for the lottery prizes, and will be divided into twenty-nine prizes. The first of these to be drawn is a "capital prize" of five hundred thousand francs. This will be drawn in 1896, and it is expected that it will create a lively demand for the shares remaining unsold. The succeeding prizes will be smaller, until the last, which is another capital prize of five hundred thousand francs, and is to be drawn at the very end of the Exposition. As the holders of the shares, in order that their chance of drawing this prize may not be forfeited, must keep them in valid condition, they will not be tempted to sell them, or the unused coupons on them, to the disadvantage of the railroads, or the treasury of the Exposition.

THE *Engineering Record* gives an interesting account of the work done at the Otay dam, near San Diego, California. This dam, which is intended to impound water for irrigating the rich lands of the neighborhood, is to be one hundred and thirty feet high in the middle, and five hundred and sixty-five feet long. A water-tight steel web, standing on a foundation of masonry, and covered with concrete, extends across the valley to be dammed, and, to give it the necessary resistance, is backed with a mass of loose rock, standing up against it with a slope of one and one-half to one. In order to obtain rock enough for this work, the engineer in charge, Mr. W. S. Russell, excavated a shaft in the slope of a precipitous hill near by, one hundred and ten feet deep, and sixty-five feet back, at the mouth, from the brow of the precipice. At the foot of the shaft he drove tunnels twenty-five feet in each direction, parallel with the face of the precipice, terminating each tunnel with a powder-chamber; and another pair of tunnels, exactly similar, was driven from a point in the shaft fifty feet higher. On their completion, the tunnels and powder-chambers were charged with thirty thousand pounds of gunpowder. The powder was fired all at once by electric sparks, and the whole face of the hill, so far as the tunnels extended, was, with very little noise, pushed out and thrown in fragments into the valley below. Mr. Russell estimates the quantity of rock loosened at more than one hundred thousand tons, which will be sufficient to complete the dam.

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ART IN THE MODERN CHURCH.[1] — X.

DECORATION [*Continued*].



Capital from the Reichstaghaus, Berlin.

THE function of decoration in a church is as distinct and as separate from its function in other classes of buildings as is the quality of its art. If we have a broad stretch of wall in a ball-room, we cover it with a painted decoration, perhaps, to remove the baldness and to give life, color and beauty to the apartment. The decoration of every civic and secular building is devised on the same basis. It is not so with the church. A church is not to be decorated to the utmost extent, covered with color, set off with statuary and carving, crowded with tapestry, glass, goldsmith's work, the manifold artistic offerings of wealth and art, to delight the eye, to charm the senses, to please the popular taste. No, nor even to beautify the edifice! All of these things influence the decoration of a secular building, but they have no part and parcel in the church.

For what is a church but the house of God? And has the pleasing of man's poor eyes, the delight of his mind, the tickling of his senses, a place in so holy and consecrated a structure? What is man that his pleasure should be considered in the house of the living God? And why, it may be further asked, should the house of God be decorated down to the human level — Heaven brought down to earthy standards, the Godhead measured by human ideals? It is repulsive to say these things, because they imply that the difference between man and God is scarce more than a difference in name. We may look up to the Heavenly Father, but we cannot elevate ourselves to the plane of the Eternal. Yet, if we were to consider only the human side in decorating and building our churches we should be so far forgetting the significance of God and His relations to us as to value Him and them by human standards only. We need, in fact, to rid ourselves of human associations in our church buildings. Human notions, that is to say, which suggest that the church is for man more than it is for God. But when once the idea that the church is the house of God is fully grasped, when all the tremendous import this fact implies is comprehended, then the true nature of the church building, its architecture and its decoration, its purpose and its utility, can be clearly understood, and the work of building and designing a church be carried out on truly Christian lines.

But, it may be asked, if we decorate all our buildings save our churches in order to make them beautiful, and if in these buildings we use the same material, though granting a distinct quality for the church's decoration, how can we escape the same result in the church? Is not all decoration decoration? Does it not always beautify, where it is good and proper? True; but the difference between sacred and secular decoration is this: in secular decoration we decorate in order to please the eye; in sacred decoration we decorate to the glory of God. And because we cannot glorify God with ugly things or by improper means, or by paltry ideas or slovenly workmanship, it follows that sacred decoration must have as beautifying an effect, be as beautiful in its results, as decorative, if you choose, as decoration devised for that purpose and for no other. The beautifying and ornamental effect of sacred ornament is a consequential property to its sacred character; it is not its first and chiefest quality.

The decoration of the church, therefore, proceeds on the lines of glorifying God, of exalting His handiwork, of proclaiming His majesty, power and might, of setting forth His tenderness and mercy, of illustrating His goodness, of preaching His word. Seen in this light, church decoration becomes a consecrated and holy thing, rising above the materials of rich upholstery, of finely blended colors, of light and delicate carving. It has a mission to perform, a duty to accomplish, that gives it a solemn and noble function in the house of God. It is something that cannot be measured by quantity, that cannot be purchased by the yard or foot, that is not to be had mechanically, but which must speak out its message, clear and distinct, with no uncertain voice.

And so, if we apply decoration to our churches for the glory of God, the richer it is and the more there is of it, shall not God be the more glorified? In a measure, yes, and always so, if the quality of our decoration is always Christian, and if it is applied in a truly Christian spirit for a Christian purpose; no, if it be simply to set forth the riches of the builders, to amplify human pride, to testify to the generosity of its givers. How far Justinian felt the proper Christian spirit when he built and decorated his sumptuous church of the Sancta Sophia we cannot tell. But at that time the Christian spirit animated artists and people alike in a way we cannot now understand. The emperor, if the records are to be believed, appears to have regarded his handiwork with perhaps not unnatural pride, when he gazed upon its unparalleled splendors on its dedication day; but, however he felt, we may be sure that the spirit that animated the countless artificers that produced the masterly whole was one of pure Christian faith and purpose, so that the entire building in its architecture, as well as in its marvellous decoration, spoke of the glory of God and that alone.

The Church of S. Mark, at Venice, gives us a better idea of the sumptuous effect of a Byzantine church than the present cold and bare interior of Sta. Sophia. It contains no undecorated surfaces, no parts that have not been richly adorned. The columns are of precious marbles; the capitals are splendid types of carving; the walls and roofs throughout are covered within and without, save the outer roofs, with the most brilliant mosaics; objects of bronze and of gilt add to the splendors of this interior, that both fascinates and impresses by its majesty and its beauty, its sumptuousness and its grandeur. And it is a Christian interior. Those columns of costly stone and marble were transported from the most distant points, that God's temple might be made as fitting a place for His worship as the poor resources of mortal man afforded. Those brilliant mosaics tell in plain and forceful language the story of God's message to mankind, and the history of His chosen ones. The lesser ornaments have their place for similar purposes. And though to-day we go to this marvellous church to study its art, its Christian lessons are taught as directly in its decoration and in that material we so glibly analyze and discuss, as when fresh it was unveiled to the eyes of the pious and awestricken Venetians.

We cannot to-day decorate our churches on the scale of magnificence employed by the Byzantine builders, who of all Christian artists produced the richest interiors. Perhaps it is as well, for we have not, as yet, the men to decorate such spaces in a consecrated and godlike manner. Perhaps we cannot even decorate our churches at all, for decoration is a costly process, and ofttimes we must fain be content with so small a quantity of it as scarce to feel we have it. But it is useful to look at such churches as S. Mark's in order to see how completely a church may be decorated, how lavish may be the ornament, how rich the detail, and yet, withal, no overcrowding, no vulgar display, no ostentatious padding, no swollen pride. It is an art we cannot have, though there are some who tell us we may reach it in time. Perhaps so; but the spirit must come first before the work. And the spirit present, the work is easy.

S. Mark's is an extraordinary example of an extraordinary church. The possibilities it suggests are quite without the reach of the ordinary and average American church, where there is so little to spend for decorative purposes, and where the art, owing to its cost, is often and necessarily, of the simplest character. Nevertheless we know that God does not despise the simplest offering.

"And Jesus sat over against the treasury, and beheld how the people cast money into the treasury; and how many that were rich cast in much.

"And there came a certain poor widow, and she threw in two mites, which make a farthing.

"And he called unto him his disciples, and saith unto them, Verily I say unto you that this poor widow hath cast more in than all they which have cast into the treasury;

"For they did cast in of their abundance; but she of her want did cast in all that she had, even all her living."

Could anything be clearer? It is the spirit of the gift that consecrates it and makes it acceptable to God, not its intrinsic worth in human money, not its value in human estimation. And so, be the decoration of our church ever so poor, be its architecture ever so slight, if it speaks of a pure Christian spirit, and is a true offering to God, we may be assured it does not fail of its purpose, nor that it is the less acceptable because of its poverty.

The church need not, therefore, be richly decorated nor sumptuously furnished in order to be Christian. But be the decoration ever so slight and unimportant, it must bear the full impress of Christian character. This is the first essential of Christian decoration, and its importance can scarce be overestimated. Any sort of thing will not do for a church, simply because it is cheap, or perhaps may be had for the asking. No subject of an earthly ruler, no citizen of a republic would think of approaching his sovereign or his chief magistrate with a second-hand gift or a tawdry bauble, perhaps offensive in its vulgarity. How much more, therefore, should we dread to approach the heavenly King with an unworthy offering, prompted by no proper spirit, without proper character of its own? Truly, in few things are we so presumptuous as in our ways of approaching God; yet, perhaps we are so most of all in the manner in which we deck out His house and adorn His temple.

But though God loves the humble offering of the humble, the generous disinterested offerings of the wealthy are not less acceptable. So that, if the means of providing costly decoration in our churches be provided, it is seemly and fit that they be accepted and decorated in such a way as will enable us truly to "worship in the beauty of holiness." In our great cities, where so many of our churches are organizations tending to the care of the souls of the rich only, a very marked tendency has recently been developed towards enriched interiors. The decoration of churches, in fact, has become so important a matter that commercial enterprise has enlisted in it, and the work that once was the thank-offering of the artist, is now performed as a mercantile pursuit at the least possible cost!

Into the merits of these commercial undertakings it is not my purpose to enter. It is sufficient to point out that the commercialization of Christian art is directly at variance with its purpose. The

[1] Although the author of this paper has drawn the greater part of his illustrations from designs that have appeared in this journal, he and we are under obligations for the remainder to the *Inland Architect*, the *Northwestern Architect* and to *Architecture and Building*. Continued from No. 1042, page 120.

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making of consecrated offerings to God is incompatable with haggling over bargain counters or with efforts to obtain the greatest possible effect at the smallest cost. The widow deliberately cast all that she had into the treasury; she did not seek out a discounting syndicate whereby her offering might have looked as large in the eyes of the world and yet still have left her somewhat to live on.

The decoration of a church is to glorify God and to illustrate His message to humanity. This is no arbitrary or fanciful meaning, selected to bear out a theory, but it is the plain teaching of the history of Christian art. The decoration of a mediæval cathedral can scarce be separated from its architecture. No style of architecture so completely assimilated the allied arts as the Gothic, so that it is impossible to consider what may be termed its architectural parts apart from its decorative elements. Nevertheless, the sculpture, the painting, the glass, the tapestry, the smith's work of a Gothic cathedral have an artistic and Christian value apart from their architectural associations. The moveable objects that pertained to the cathedral ritual, or temporary decorations like tapestries and hangings, do not come within the province of architectural treatment, though it is obvious that both in quality and in purpose they are to be governed by the rules that guide the selection of the architectural decorations. We have, therefore, three great classes of church decoration to consider, which are closely connected with architecture. These are sculpture, painting and glass.

At the outset it is necessary to remember that there is nothing sacred in a painted picture, in a carved block or a piece of colored glass. The theme is what determines the sacred nature of any form of decoration, and after that, the quality of the art. And so, there being nothing sacred in the materials of the decorative adjuncts, and a church's naturally permitting only sacred decoration, it follows that the theme is the first essential to be considered. And the history of Christian architecture speaks with no uncertain voice on this head. The countless sculptures that decorate the cathedrals and churches of France, — the myriad paintings which cover the walls of Italian churches, tell us plainly that their purpose was to teach the people. And how grand an art is that which conveys God's message to man, while adorning His temple! The French sculptures and painted-glass windows were the chief means whereby the people of their contemporary days were instructed in the Gospels, in the stories of the saints, in the precepts of the church. Then few could read, and books were all but inaccessible to the multitude. But the stone books of the church, the decorated portals, the elaborate friezes, the monuments, the panels of sculpture, not less than the richly painted glass, presented lessons of imperishable truth upon every hand. The service of the day over, the sermon ended, the sermon in the sculptures and the windows went on. Went on, indeed, until their creators had been forgotten, until a new world had been discovered, until a new culture had come into vogue, that little understood the message or the purpose of these hoary figures, which, to-day and to us, preach as directly, as religiously and as purely as to those for whose instruction and edification they were originally intended.

In other words, the most elaborate decoration of the most Christian structures — structures, that is to say, that most freely breathe forth the spirit of Christian faith in architecture — was a preaching and teaching decoration. That it decorated was a fortunate and a delightful circumstance; but its primary purpose was to teach. This, indeed, is the greatest lesson Gothic architecture has to give us. It rises above style and form, is not concerned even with a modern use of Gothic, but it is a fact that belongs to all Christian buildings, though the Gothic witnessed its utmost development. It is the central truth in Christian decoration.

Yet in what modern American church can this Christian decoration be found? Where is a modern decoration akin to that of the mediæval churches, be they great or small? What opportunities does the modern church offer to the sculptor or the painter? Some few things we have. Perhaps a reading-desk for the minister to place his sermon on; a baptismal font; a bit of brass let into the wall. These are the usual form of church decoration not strictly architectural that is practised in the present day. Yet they are almost all we have; for apart from the capitals of our columns, or the frames of our doors and windows, few modern churches boast a carved decoration of any sort. In some of the liturgic churches more may be found: a sumptuous altar, a rood-screen, more elaborate furnishings, but at the most a small and paltry showing compared with the splendid structural material of the mediæval cathedrals.

The most popular form of modern church decoration is painted glass. And it is safe to say no form of church decoration is at once so misused and so misunderstood. Very considerable mechanical advances have been made in the production of American stained glass within the last few years; there has been an improvement in theme and in treatment, compared with what we did twenty years ago, or even later, but these technical improvements have not been accompanied, as a rule, by an increased perception on the part of the producers of painted glass, of the Christian utility of this extremely rich and effective mode of church decoration. Unlike sculpture and painting, it is a style of decoration that has been eagerly sought by Christian churches of all faiths and beliefs. Neither of the two great arts have as yet made much progress in the non-liturgic and ultra-Protestant churches; but painted glass is found everywhere, and its almost universal usage seems to suggest that, in the minds of its users, it is a peculiarly Christian form of decoration.

In one sense this is true, since painted glass was first used in the churches, and in the twelfth and thirteenth centuries reached a marvellous development of perfection. A wondrous art it was then, with its sumptuous blending of the richest colors, its complicated designs, its images of saints and pious folk, its many figured gospel narratives and sacred legends, the seemingly infinite resources of the artists! Here, as in the sculptures, the common people could trace out many a sacred story, told in brilliant colors, with strong dramatic effect; their eyes were charmed with the glowing colors, while their minds and hearts were instructed in the tales illustrated. And all this was accomplished in a truly Christian manner, for the designers of these rich windows realized to the full the purpose of their art. They were not decorators but instructors, and though the ravages of war and the iconoclasms of bigotry have destroyed many monuments of their art, enough of their precious workmanship has survived to our own time to tell us how glorious it was and how grandly it set off God's house while telling His message to humanity.

Go, if you can, into the choir of the Cathedral of Tours, or into the Cathedral of Le Mans, or of Chartres, or of Bourges, or of Laon, stand before those glowing walls of color, brilliant in the warm sun with more hues than seem known to man, and note how God may be glorified, His house adorned, His worship strengthened by this magnificent material! There, indeed, is rare art and beauty, piety and faith, Christian fellowship and doctrine, the story of a soul, its hope, its future, the Christian life in all its detail. Truly, this is Christian art, composed with magnificence of detail, a sumptuousness of material, and a prodigality of feeling, reverence, love and faith, that is bewildering in its beauty and overpowering in its splendor.

This is the Christian use of painted glass in its finest form and its highest. We have nothing comparable to it in our American churches, even where expense has not been stinted and the largest outlay made. A wall of glass, such as a Gothic clerestory, presents in the best type of a French Gothic church, is infinitely more imposing, through its sheer mass, and the apparent audaciousness of the structure than any series of disconnected windows. The size of our churches, thus at the outset, prevents the obtaining of anything approaching the mediæval effect. Our windows, indeed, do not pretend to be more than a series of openings cut in the wall, and these are filled with glass, generally put in place at intervals of time, as memorials to the pious departed, and represent more a collection illustrating the various steps of progress by modern manufacturers than any proper and pious decoration for a church.

Of the general character of American painted glass it is not my purpose to speak. It is sufficient to remark that it does not, as a rule, illustrate Christian ideas, nor is it composed in a Christian spirit. Its underlying principle is decorative, and its development has been pushed in this direction. Yet decoration is quite an improper thing to apply to a church. Its ornament must be to glorify God, while decoration, in the ordinary sense, is something to please the eye and to satisfy the human mind.

The use of sculpture and painting in our modern churches, as has been said, is very slight and almost unknown. In fact there are few non-liturgic churches where either may be found, and even in the liturgic churches there is little enough of them. Yet many of man's most inspired works are in these arts; Christian thought and tradition have been illustrated in them again and again, while the whole world gazes amazed at the beauty and the quality of its greatest religious paintings and sculptures. They are noble arts and Christian arts, in the hands of Christian artists, and need no defence for this. Yet how often do we so much as think of adorning our churches with a fresco, and how much more rarely when the work is undertaken do we obtain something wholly Christian! In this, however, our modern successes are perhaps more numerous than in architecture. In the painting of the "Transfiguration of Our Saviour," over the altar of the church of that name in New York, Mr. LaFarge has produced a painting that is at once religious in the highest sense, and eminently Christian in its purpose. No more splendid monument has been reared in this country than this great mural painting, and it significantly points the way to what might be accomplished were more frequent opportunities offered to our painters.

The Episcopal church stands almost alone in thus fostering art; its ritual readily lends itself to rich interiors and highly decorated structures. The Roman Catholics are not so successful, though their ritual is more elaborate and the opportunities for painted and sculptured ornament more frequent. In this church it is not the opportunity that is lacking, but the knowledge of what use to make of the opportunities; and the almost pitiful ignorance among the Roman Catholic clergy of the first elements of Christian æsthetics is due to generally decadent effect of their artistic enterprises. Their failure to rightly grasp their opportunities is the more marked because the chances of obtaining fine results are so very numerous.

But apart from these two religious bodies, where do we find either painting or sculpture in the churches? How many Presbyterian churches can exhibit a picture of our suffering Lord, or of His triumph, though their own *raison d'être* is His glorification and the redemption of mankind by His suffering? Where is a Methodist church that thus offers visual and constant testimony to its faith and its founder? Or a Baptist? Or a Congregationalist?

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A cowardly fear of popery long since drove the image of our Lord from these structures that professedly are built for His glory. Scarce even the sacred symbol of the redemption, the cross, appears upon them. But surely Protestant intelligence has advanced beyond an unreasoning fear of the prisoner of the Vatican and his church! Surely we who prize the picture of our earthly father, mother, brother, sister, child, can value at its true worth some pious picture that aims, in a thoughtful, Christian way, to represent some event in our Lord's life, and actively recall it in realistic form? Surely the Protestant conscience can withstand so severe a shock as that! For this very conscience, when it goes abroad, stands in ecstacy before the great religious paintings of the Vatican itself, marvels at their religious feeling, their love, their tenderness, not less than at their technical skill.

God put into the minds of some men the power to paint and to carve. To some He gave greater gifts than to others. To some He gave powers in one direction that was not open to others. The gifts of painting and of sculpturing are divine gifts, holy and precious things, not to be despised. Why, then, should we hesitate to set forth the majesty of God and all the infinite qualities He represents, in these forms which He has given us? If the gifts have been misused, if they have been put to improper uses, and men led astray by them, shall we, on that account, abhor them because we can rise above the petty failings of an ill-developed age, and see things with a broader, calmer spirit.

No! The history of Christian art shows a long and constant appreciation of God in art; if we would close the door upon it and enter upon a new pathway, we should indeed be embarking upon a strange unopened road. Protestant misunderstandings and bigotry, and Roman Catholic devotion to images have both done much to throw down painting and sculpture from their true place in Christian æsthetics. Thus have two great errors sought to put down truth.

There is no longer need to fear a painted picture or an inanimate piece of stone if they be consecrated to God's use. Let us, then, hang pictures in our churches and place statues within our holy places. Yet such disposition must be arranged in a holy and harmonious way. Any picture will not do for the Lord's house, any more than any sort of thing will do for an art museum. Our pictures in our churches must be truly Christian pictures, speaking of God and His work, and endowed with a true and holy and Christian spirit.

And so with the lesser arts or with painted or carved decoration that does not attempt pictorial scenes, but which occupies the more humble post of pure ornament. In the forepart of this chapter it was pointed out how history tells us we may use all the forms of nature, yes, even every shape and combination of geometry for our churches, if we but use them in a Christian manner. It is not the form that consecrates such ornament, but the spirit, and it is this spirit, pervading the church building in its every part, in its architecture, its painting, its sculpture, its carving, the stencils upon its walls, as well as the holy vessels upon the altar, the painted glass of the windows and the colored tiles of the floor — a subtile, unseparable quality that is present everywhere, yet speaketh not aloud — this quality it is that makes a religious building Christian, separates it out from other buildings and consecrates it to the glory of God.

BARR FERREE.

(To be continued.)

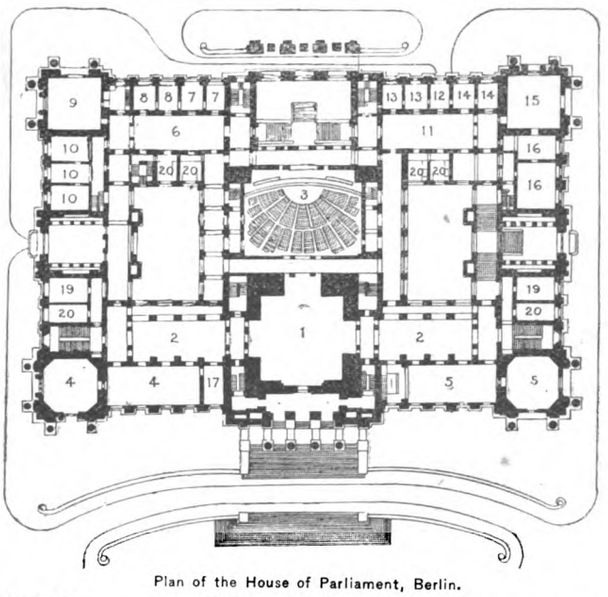
Berlin

THE BERLIN PARLIAMENT-HOUSE. — MEMORIAL CHURCHES. — NEW THEATRES IN VARIOUS CITIES.

THE number of public buildings which are approaching their completion in Germany, and the number of monuments which are being unveiled is simply stupendous. It is not possible to even casually allude to all the more important ones, and hence I will simply give some particulars of the more striking examples.

I have referred to the Imperial Houses of Parliament at Berlin in a former letter, or, rather, to some of the controversies for which this building has become famous. The building was duly inaugurated some time back and it is now gradually nearing its completion, with the exception of its interior sculptural and fresco decoration, which will be in execution during a number of years more. By the courtesy of the architect, I am able to give you some details of the large Council Chamber and I take the opportunity of giving a few particulars of the interior arrangements with the aid of a sketch-plan, delaying my description of the exterior until good illustrations of the latter are forthcoming.

Referring to the plan, we find the main entrance to the building, from the Königsplatz, is approached by an incline, and a flight of steps which lead directly to the main floor. The entrances from the back and sides are, on the other hand, on the level of the street, and the main floor is here reached by flights of stairs off the respective vestibules. The entrance on the north and south sides will probably play the rôle of St. Stephen's entrance to the House of Commons, London, while the entrance from the rear is reserved for the



Plan of the House of Parliament, Berlin.

1. Central Hall.
2. Main Lobbies.
3. Council Chamber (Reichstag.)
4. Writing and Reading Rooms.
5. Refreshment Rooms.
6. Speaker's Lobby.
7. Speaker's Study.
8. Secretaries' Office.
9. Speaker's Library.
10. Administrative Offices.
11. Ministerial Lobby.
12. Ante Room.
13. Chancellor's Rooms.
14. Offices.
15. Council Chamber.
16. Committee Room.
17. Post Office.
19. Private Room.
20. Lavatories.

Emperor, the upper house (Bundesrath), the ministers and the speaker. Only the north and south entrances are properly provided with cloak-room accommodation, the main entrance having no accommodation whatever of this kind.

The plan of the main floor practically explains itself, and we need only note that the amount of space devoted to lobbies and passages seems remarkably large. The main lobbies with the central hall have a length of nearly 100 metres (328 feet), the span of the hall being 24 metres, or 78 feet. The speaker's and the ministers' lobbies measure 95 feet by 29 feet 6 inches respectively, and the vestibule at the rear 78 feet by 52 feet.

The great Council Chamber, which is lighted from above, measures 95 feet by 69 feet; the small Council Chamber, for the "Bundesrath," 42 feet 7 inches by 42 feet 7 inches. The reading-rooms and refreshment-room, off the main lobbies, are exceedingly roomy, while lavatory accommodation is somewhat limited. The plan of this floor will, it is thought at Berlin, answer its purpose well, though we can scarcely understand the absence of comfort for the individual member of Parliament, and doubt if many parts of it will be sufficiently lighted.

Passing an *entresol* which faces part of the rear and sides only, and contains the galleries to the large Council Chamber and a great deal of press, office and storage accommodation, the second main floor is reached. This floor is practically entirely devoted to committee-rooms, of which there are twelve, with dimensions ranging from 82 feet by 55 feet 9 inches, and 15 feet 6 inches by 32 feet 9 inches for the largest, to 39 feet 4 inches by 23 feet for the smallest. The north side, however, contains a spacious library, measuring about 164 feet by 78 feet, which is to be used for reference purposes, and in connection with it there is a librarian's office, workrooms, etc.

The ground-floor, if it can be so-called, is essentially for the administrative part of the building, though there are also two committee-rooms on this level. The official shorthand-writers, the ushers' offices, the printing press, the kitchens, police, fire-brigade and post-office have been found room for, and there is also a spacious strong-room. The entrance to the public galleries has also its own lobby, measuring 92 feet by 42 feet 8 inches off the north entrance on this floor, and there is likewise a small press lobby on this level. All the machinery necessary for the Reichstaghause has fortunately been given a building of its own on a site a couple of hundred yards away.

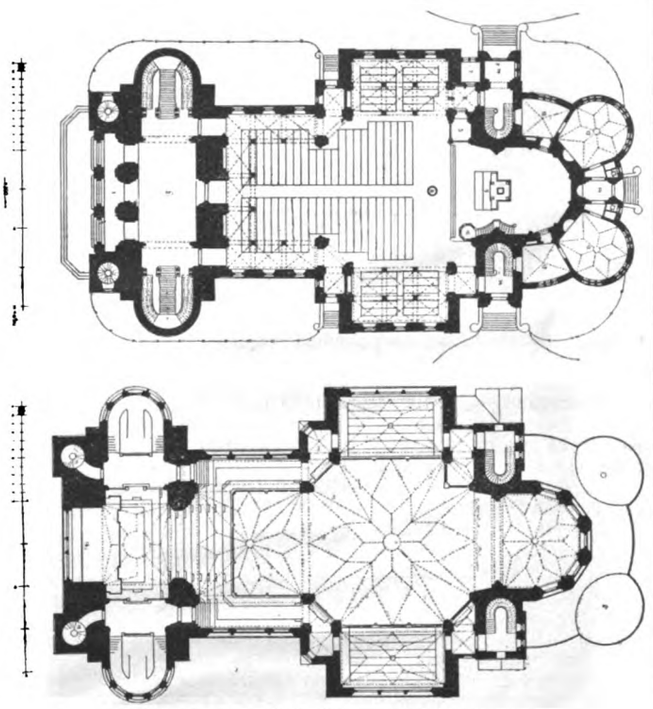
The Imperial Parliament House is naturally the most important structure for administrative purposes which the German Empire has erected, but it is almost rivalled by the Imperial Law Courts at Leipsic, which were opened by the emperor on October 26th, and of which I shall speak at future date. The new General Post-office at Berlin, the new District Post-office at Frankfort, the new Law Courts at Bremen, and the Technical College at Darmstadt, all blocks of architectural pretensions which will call for notice in these columns, were opened in the same week as the Leipsic "Palais de Justice." This will give some idea of what I call "stupendous" when I speak of the activity in German public works. Churches are also being opened wholesale, though the Germans are by no

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means a church-going folk. The empress has set the fashion, and acts as patroness to most enterprises of this kind, and as the committee-men always get the distinctions so much prized in the Old World for any successful undertaking of this kind, there is no lack in initiative to put up places of worship by fair means or by foul.

The Emperor William Memorial Church is perhaps the most important of these buildings. It was opened in September, soon after a memorial church to the Empress Augusta. Since then a memorial church to Emperor Frederick has also been consecrated. I add two plans by the courtesy of the architect, Herr Schwechten; these will explain the arrangement of the building. I will only add that the architect had £160,000 or $800,000 at his disposal, and that the style he adopted is Romanesque, similar to the rendering of the old churches on the Rhine, more especially at Cologne. The materials were freestone, and much attention was given to the wrought-iron work, the joinery and the semi-relief decoration. The seating capacity is two thousand.

There has been an amusing affair in connection with the completion, though it certainly had a vulgar look about it, not to say an intimate connection with sacrilege. The City Fathers of Berlin had been asked to contribute £15,000 to the building fund, but they had refused. On the opening-day the following words could be seen chiselled right across an unfinished semi-relief: "What camels our city fathers are, they cannot even afford £15,000; how mean!" The architect, on being called to account by the indignant authorities, tried to excuse the words as "a joke." I don't pretend to say the architect was "in the know," but it was bad taste to try excuses.



Plans of Emperor William's Memorial Church, Berlin.

The affair may be a warning to economical authorities, but the taste of vulgarity and sacrilege is rightly condemned by the London *Builder*.

Of monuments unveiled lately, I will only mention the Emperor Frederick Memorial on the Franco-German battlefield at Woerth. William II and the Dowager Empress were present at the unveiling, which was the occasion of a great ceremony.

Speaking of private building activity, I would note that the *American Architect* referred at some length to theatre enterprise at Berlin in 1894. This kind of enterprise is constantly on the increase, and though the harrassing theatre regulations prevent as large a number of play-houses being put up as company promoters would wish, they, at least, ensure the new structures being well built, and also becoming monumental blocks of architectural pretensions, owing to the prominence of their position enforced by the "open site" clause of the official code. In Berlin the new theatre has now been opened. It has been built for first-class drama. The Ronacher Variety Theatre is in full swing, opera comique being on the play-bill. Herr Heinrich Seeling is the architect of the former theatre, and Messrs. Fellner & Helmer, of Vienna, were in charge of the second. Now two large theatres are in course of erection in the west suburb, and another is being put up in connection with next year's Industrial Exhibition. Two of these are from designs of Herr Sehring. At Wiesbaden the Vienna architects just referred to have completed a Court Theatre, and Rostock & Bromberg are building municipal theatres from plans by Herr Seeling. At Eisenath there will be a subscription play-house on lines of the Bayreuth Opera-house with an area to hold fifteen hundred equally priced seats. Old theatres are also being altered and renovated. The Berlin Opera-house and the Hanover Opera-house are in the builders' hands. Kroll's Theatre, at Berlin, has been materially altered. Of new theatres in the provinces, Munich and Frankfort will have new buildings. At Nüremberg there will be a temporary modern play-house in connection with an industrial exhibition. Herr Lautenchlaeger, of Munich, is fitting it with a model electric stage.

THE LATTER DAYS OF INIGO JONES.

The patronage of the court, the love of the nobility for magnificence and the taste and genius of the artist united to place Inigo Jones in affluence, and he lived in a style worthy of a mind which expanded with its fortune. Early in life he had become a husband, but his wife's maiden name and the date of his marriage are alike unknown, nor has any one mentioned other children than a daughter, Anne Jones, who married her cousin Webb, the architect, her father's pupil. Walpole, who tells so much, though often incorrectly, speaks evidently in ignorance of the near relationship of Webb, and from him we hear nothing of the marriage of Inigo or of his children. From accidental notices we gather that he had a house at Staines, another at Cherrygarden Farm, Charlton, Kent, and that his town residence was in St. Martin's Lane. With most men of genius of his day he was familiar; Chapman was his personal friend, so was Davenant, and with Carew he lived on those terms of sociality which their labors in the court masques required. Vandyke loved him much and painted him often, and Johnson, though he heaped reproaches upon him in his latter days, it must be remembered was long his friend. The nobles respected him for his genius, and since they no longer laid out their riches on mobs of retainers, they had the more to spare for their tables, for their dresses, and for their mansions.

Architecture and painting profited by the change, and Jones and Vandyke figured as the head professors. A respect was paid to them such as had never been paid to genius in England before; the greatest of all this world's poets had indeed been the guest, but never the friend, of the Dudleys and the Devereuxes, who thought their humility great in encouraging with a kind word one who, compared to the noblest of them all, was as a god. But Jones was the companion of princes. His works, rising in elegance to all men's eyes, were not shut up between the boards of a book. All who looked could comprehend the cause of his popularity, and learned men were loud in the praise of one who imported the Classic elegance of Greece and Rome to the banks of the Thames. Those — and they might not be few — who were insensible to his high merit could not fail to understand and respect his opulence. The restoration of St. Paul's went rapidly on, and though Jones was now advanced in years his personal attendance was punctual. He looked upon the splendid western portico as the great monument of his fame, and classed Whitehall as second in beauty. The king, too, went often to see the progress of the workmen, and had his own statue and that of his father carved and placed, as they well deserved to be, on the centre of the portico.

An artist, however, seldom lives in perfect sympathy with the world around him. Jones had removed the Church of St. Gregory because it injured the effect of St. Paul's Cathedral, and this gave great offence to the citizens. To pull down a church might have been a merit in the eyes of the Tribulations and God-be-heres of those righteous times, but then to pull it down to the end that a cathedral restored, at the request of Laud, by the hands of a popish architect might appear more imposing and magnificent was a thing not to be borne, and a formal complaint from the citizens brought Inigo in 1640 before the Long Parliament. He represented that in removing the Church of St. Gregory he had added to the beauty of the City; that the Cathedral of St. Paul's had been injured in effect by an unsightly and tottering structure; and finally, that he had but obeyed regular orders in council. But he soon found that the king's word, omnipotent so long, was growing light in the balance, and being roughly handled by those stern parliamentarians, his temper gave way, and he replied with some asperity, answering scorn with scorn. They had the address, however, to question him so that, in a fit of offended pride, he took upon himself the whole responsibility, and this, it seems, he did in very lofty terms, for the Commons carried up this complaint to the Lords, that "the said Inigo Jones would not undertake the work of re-edifying St. Paul's Church unless he might be, as he termed it, 'sole monarch, or might have the principality thereof.'" The Commons, it is supposed, questioned him upon the cause of the decay of the old cathedral, and he imputed it partly to the influence of the coal smoke on the surface of the stone, an opinion formed on experience and observation.

Success at that time, and for long after, was with the Parliament, whether right or wrong; Inigo was obliged to make restitution, and his expense in this vexatious prosecution was very large. But worse followed. The King and the Parliament quarreled; the great civil war commenced; Inigo's situation of surveyor ceased, and he was, moreover, constrained to pay 545*l.* by way of composition for his estate as a malignant. He was now 70 years old and upwards, a time of life when peace and repose were needed; but these were denied him. His expensive habits and generous nature had prevented him from amassing wealth, and the little that he had remaining seemed so insecure in those rapacious times that it is said he went with his friend Stone, the builder, to Scotland Yard, where they

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buried their joint stock of ready money in a private place. The Parliament published an order encouraging servants to inform of such concealments, and as four of the workmen were privy to this conjunct deposit, Jones and his friend removed it privately and with their own hands buried it in Lambeth Marsh. These were not all his afflictions. The chief of the works on which he had depended for fame was stopped by Parliament, far short of completion, and the whole structure treated with such contumely that its destruction was dreaded.

Tradition says that the sorrowing old man was sometimes to be seen wandering in the vicinity of Whitehall and St. Paul's Cathedral looking at those splendid but incomplete works. He could see with his own eyes the degradation of St. Paul's. "During the usurpation," says Dugdale, "the stately portico with the beautiful Corinthian pillars being converted into shops for seamstresses and other trades, with lofts and stairs ascending thereto, the statues had been despitefully thrown down and broken in pieces." Of this he was witness; but he did not live to see the unfinished cathedral with its magnificent portico wrapt in those flames which consumed so much of London. "Inigo," says Walpole, "tasted early of the misfortunes of his master. He was not only a favorite, but a Roman Catholic. Grief, misfortunes and age terminated his life. He died at Somerset House, and was buried in the church of St. Benet's, Paul's Wharf, where a monument erected to his memory was destroyed in the Fire of London." Walpole adds some erroneous dates. We know that Jones was 80 years old when he died in June, 1653.—*The Architect.*

THE "BARGE OF TIBERIUS."

SOME weeks ago we described the discovery of remains in Lake Nemi which were supposed to have formed part of the vessel which was constructed for the Emperor Tiberius. A correspondent of the *Scotsman* gives the following account of the latest conclusions on the subject:

Under the platform of the Temple of Diana Nemorensis, excavated by Lord Savile when British embassador at Rome in March, 1885, looking southwest, the lake has at intervals given up to the investigator pieces of timber covered with metal, with terra-cotta or with mosaic, supposed to belong (1) to a ship, or (2) to a barge or number of barges, or (3) to a floating belvidere (the *apopsis periklustos* of Plutarch), or (4) to the substructure of a town, or (5) of a villa. Its period in history was as variously settled as its purpose or build. The reigns of Tiberius, of Caligula, of Trajan, or in Nibby's opinion, of Julius Cæsar himself, were severally assigned as its date — the last-named archæologist being the most positive as to this and as to the nature of the treasure-trove, which he found to be neither more nor less than part of a villa begun and abandoned by the first emperor.

Now all this controversy is at an end. At the instance of His Excellency the Minister of Public Instruction (the eminent pathologist and consultant, Dr. Guido Baccelli, to whom we owe Lanciani's excavation of the House of the Vestals), researches, aided by divers, have been in progress at the southwest aspect of the Lake since October 1, and the result, embodied in a report drawn up by the official excavator of the Provincia di Roma, the Commendatore Bernabei, establishes beyond doubt that the first hypothesis is correct — that the structure in dispute was really a ship and that its date is the first century of our era.

Read the day before yesterday at a meeting of the Academia dei Lincei (the Royal Society of Rome) the Commendatore Bernabei's monograph goes into minute detail as to the previous history of the discovery and as to the findings of recent research. At first what remained of the timbers, taken in connection with the metal fittings, seemed rather to strengthen the hypothesis that the floating structure was neither more nor less than a raft (*zattera*) of no great thickness, while the isolated pieces of terra-cotta and the bits of mosaic were held to have formed its flooring (*pavimento*). This hypothesis must now be replaced by the true explanation, to wit, that the structure was really and properly a ship. In proof of this, the Commendatore Bernabei exhibited drawings representing planks joined together (discovered on the 22d ult.), constituting part of the deck, with distinct traces of the calking (*calafatato*), and above this traces of a coating of lead. Evidence, moreover, of the carved framework of the hull, with the insertion of ribs, was adduced as indicating a keel (*chiglia*). The ship, he argued, was not flat-bottomed, like a pontoon, or like a great floating barge, adapted less for navigation than for supporting heavy weights. It had not only the keel but the upper keel (*sopracchiglia*) and all the other adjuncts of a properly constructed ship.

What misled even so accomplished and acute an archæologist as Nibby were the remains of the mooring-quay or bridge for landing from the ship. The two beams he referred to in support of his view, and long supposed to be lost, were rediscovered quite lately in the Vatican Museum, and identified as those fished up in 1827. The mooring-quay was, according to the Commendatore Bernabei, fitted with earthernware and leaden pipes as conduits, and the remains of them (particularly the bricks found in great quantities in the Lake at the spot in question) could have had no structural connection with the interior of the ship. As to the date, he showed that Pirro Ligorio's view that the ship belonged to Caligula's reign was the right one. In fact, the leaden tubes recently found as part of the landing-quay (*banchina di approdo*) bore that emperor's name, while the brick stamps were also those of the same period.

The reading of the monograph produced a profound impression on an exceptionally numerous and intelligent audience of archæologists, many of whom will, in a day or two, accompany His Excellency, Dr. Baccelli, to the romantic scene of this most interesting discovery.

THE ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

STAIRCASE HALL: "AULDWOOD," HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

OTHER views of "Auldwood" have been published in the *American Architect* for October 26 and November 16, 1895.

THE IMPERIAL LAW COURTS, LEIPSIC, SAXONY. HERR LUDWIG HOFFMANN, ARCHITECT.

[Issued with the International and Imperial Editions only.]

STAIRCASE HALL AND STATUED NICHE IN THE SAME.

[Issued with the International and Imperial Editions only.]

SEE letter from Berlin elsewhere in this issue.

THE COURT-YARD OF THE HÔTEL CUJAS, BOURGES, FRANCE.

[Issued with the International and Imperial Editions only.]

A DESIGN FOR THE MINNESOTA STATE CAPITOL, SUBMITTED IN THE SECOND COMPETITION. MESSRS. WYATT & NÖLTING, ARCHITECTS, BALTIMORE, MD.

PLANS AND SECTION OF THE SAME.

DETAIL OF THE COUNCIL-CHAMBER, HOUSES OF PARLIAMENT, BERLIN, PRUSSIA. HERR PAUL WALLOT, ARCHITECT.

SEE Berlin letter elsewhere in this issue.

[Additional Illustrations in the International Edition.]

GARDEN FRONT, "AULDWOOD," HOUSE OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

THE TERRACE: "AULDWOOD."

[Gelatine Print.]

EAST ENTRANCE: PORTLAND PLACE, ST. LOUIS, MO. MR. T. C. LINK, ARCHITECT, ST. LOUIS, MO.

[Gelatine Print.]

BEDSTON COURT, BIRKENHEAD, ENG. MESSRS. GRAYSON & OULD, ARCHITECTS.

REDCLIFFE PARISH ROOM, BRISTOL, ENG. MR. H. C. M. HIRST, ARCHITECT.

HOUSE NEAR COLESHILL, ENG. MR. E. C. BEWLAY, ARCHITECT.

EXHIBITIONS

ATLANTA, GA.— *Cotton States and International Exposition:* September 18 to December 31.

BOSTON, MASS.— *Paintings recently purchased; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt:* at the Museum of Fine Arts.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St.

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Chicago, Ill. — *Paintings by the Chicago Palette Club and Chicago Art Students League:* at the Art Institute, December 12 to 29.

New York, N. Y. — *Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures:* at the Metropolitan Museum of Art.

Fourteenth Autumn Exhibition of the National Academy of Design: December 23 to January 11.

R. Caton Woodville's "1815": at the Schaus Gallery, 204 Fifth Ave.

Pastel Portraits by J. Wells Champney: at the Knoedler Gallery, 170 Fifth Ave.

Flowers in Water-color, by Paul de Longpré, also, Butterflies of all Nations: at the American Art Galleries, Madison Square South.

Philadelphia, Pa. — *Sixty-fifth Annual Exhibition of the Pennsylvania Academy of Fine Arts:* opens December 23, closes February 22. The Architectural Section of the Exhibition closes February 1.

Providence, R. I. — *Exhibition of Posters:* at the Rhode Island School of Design, until January 1.

NOTES AND CLIPPINGS

Artistic Perceptiveness in Philadelphia. — Apropos of the recent competition for the Art Building in Fairmount Park, the Philadelphia *Press*, with great good sense, remarks that it is "perhaps to be regretted — and this can be said without any feeling of provincialism — that out of the sixty-seven designs submitted, a Philadelphian should not have secured one prize, and to be regretted the more that the chief prize did not fall to a local architect. While there has been certain work in this city which has done much to debauch taste and make 'Philadelphia architecture' a by-word, there has been of late a new spirit, and it is safe to say that no City-hall monstrosity will ever be perpetuated in the future. In view of this it is unfortunate that this fresh and virile ability which rules among the younger architects of the city did not capture the prize design on the merit alone."

Eccentric Spires. — The Exchange in the City of Copenhagen, with its curiously fashioned tower and spire, is deemed one of the sights of Denmark's capital. It is one of the most remarkable examples of eccentric architecture, although the architect in his desire for originality has not sacrificed the grace of form. The lower part is octagonal in shape, but the upper part consists of four carved dragons, whose tails, gracefully entwined, gradually taper away, and form the spire of the Exchange. The tower is 165 feet high, and was erected about 1815. The most eccentric church spire is that of the Parish Church (All Saints) of Chesterfield, with its curious spire, 228 feet high, and six feet off the perpendicular. Whichever way the observer looks at this curious spire it appears to bulge out in that direction. — *London Tit-Bits.*

A Plan for an Art Commission for Washington. — "The Secretary of War," says the Washington *Star*, "voices a wide public sentiment when he pleads in his annual report for the creation of a permanent Commission to pass upon all questions of art involved in the erection of monuments and statues at the National Capitol. The existence in the past of such a board of competent artists and architects would have caused the monuments of the city, which are really national in their character, to present at this time a more homogeneous appearance and a stricter fidelity to the best principles of art. In the matter of the selection of sites, too, advice could profitably have been taken in many cases from men who would look upon the matter from the point of suitability and harmony of surroundings, and perhaps there would have been avoided some positive incongruities that now exist. The city will soon receive many additions to its already munificent store of monuments, and the creation of this permanent Commission should not be postponed until all the best sites along the magnificent avenue extending from the Capitol to the White House and on other thoroughfares of the city have been occupied.

Slag Building-blocks. — A method is in use at the Königin Marienhutte at Cainsdorf, in Saxony, for making the building-blocks from furnace slags. The method is based on the fact that if a large lump of solidified slag is broken by hammering, the pieces from the interior are always considerably tougher and stronger than the outside. A pit is made, lined with suitable brick or stonework. The bottom consists of a cast-iron plate two inches thick. On this plate stand iron blocks, or carriers, two inches high, which support another iron plate having holes two inches in diameter left in it. On this perforated plate stand the moulds for the slag blocks, so arranged that each mould stands over one of the perforations in the plate, the moulds themselves being open at the bottom and top, like moulds used in making bricks by hand. After the moulds are placed on the plate, they are covered over by another plate, or plates, with similar perforations, one to each mould. The slag is allowed to flow into the pit and down on to the bottom plate, rising up and filling the space between this and the plate under the moulds, and passing into the latter through the perforations. The liberated gases escape through the perforations in the plate covering the moulds, till the slag rises high enough in the pit to cover this plate and flow into the moulds also from the top. The slag is allowed to rise at least two inches above the top plate, and then the mass is left to cool slowly for thirty-six or forty-eight hours, according to the size of the pit, after which the slag blocks are broken out. The blocks so prepared are said to be very good, and are used for pavements, for building, etc. Even very basic slags and blast-furnace slags are stated to make very serviceable blocks under this treatment. Instead of a special casting pit for the blocks, the slag waggon may be used by putting the iron blocks or carriers on the bottom of the waggon, and placing the mould then between two iron plates, as above described. — *Illustrated Carpenter and Builder.*

No Hope of Discovering Relics of the Alexandrian Library. — At the meeting in London of the Egypt Exploration Fund, the other day, Mr. D. G. Hogarth, the well-known explorer, said that the excavations of last season had convinced him that there was no hope of the preservation of any of the contents of the libraries of Alexandria within the city. Not only has the subsoil water risen generally above the Roman level, but, even where the water does not reach, there is a great deal of damp sucked up by capillary attraction, so that there is no chance, even if any papyri were found in Alexandria, of their being legible at the present day. Mr. Hogarth emphatically expressed his conviction that, whether the great libraries were totally destroyed or not, there are not under the houses of Alexandria at this day literary remains of any one of them. One of the main reasons for stopping the work at Alexandria was that even below the water-level everything was found to be in the utmost state of ruin: walls knocked down, pavements ripped up, everything as it would be left after the most awful sack and pillage. This had been the experience of every excavator there. The explanation of this fact could only be sought, he thought, in the history of Alexandria, and he suspected that the Arabs were more responsible for it than even the early Christians or the Roman mob. After the Arab conquest any of the books which remained would naturally drift from Alexandria to Cairo. It is not, however, in the rainy delta that they must be sought, he declared, but higher up the Nile, where man has been less active. It is only to Egypt, he said, that we can look with any confidence, to the Fayûm and to the dry upper valley of the Nile, for the lost classics — perhaps for Sappho and Menander — and for the missing early Christian literature. — *N. Y. Evening Post.*

A Church built by One Man. — There was dedicated on December 15, at Hepburnville, Pa., as unique a Presbyterian Church as exists anywhere in Pennsylvania. It is a beautiful stone structure, and the walls were not only laid by one man, but he also hewed out the stones from great bowlders on Brobst Mountain. He labored more than six years, never drawing pay for his work, and when he died, recently, he bequeathed his unpaid wages to the church. This man was George Taylor. In the church he reared is a pretty memorial window erected by a grateful congregation for the aged and untiring builder. It is called the Lycoming Centre Presbyterian Church, and stands at Hepburnville, seven miles north of this city. The congregation is composed mainly of well-to-do farmers and their families. The church is 60′ x 38′, with a square tower sixty feet high. About a year ago, when he had just about finished the tower and his long labor seemed about to end, Taylor grew ill. His hammer and chisel were laid aside, and they were never again taken up by him. He was about seventy years old, and died from cancer. When Taylor died a will was found, in which the story of his devotion to the church was made complete. All his wages, amounting to many hundred dollars, was bequeathed to the congregation. There remained a small debt, which was practically wiped out by those gathered in the pretty house of worship to see it dedicated. — *N. Y. Tribune.*

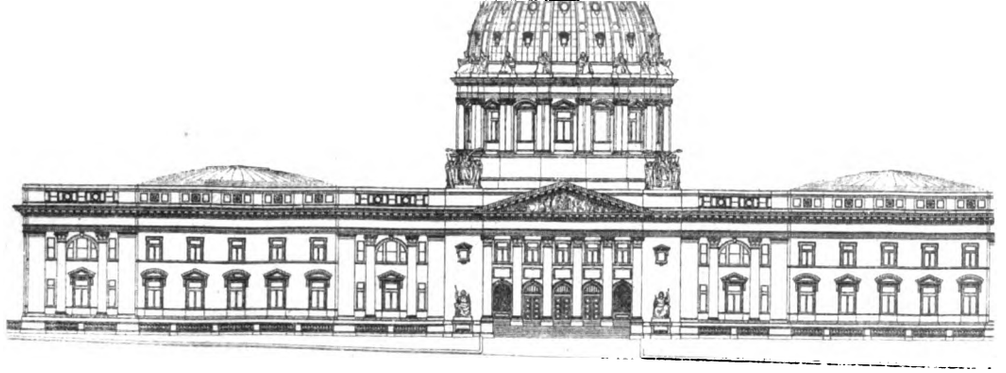
Moved his House by Water. — A remarkable feat in the line of house-moving has just been accomplished at Eureka, Cal. Attorney Ernest Sevier, through the workings of the law, found himself in possession of one of the finest residences in Arcata. As Mr. Sevier lives in Eureka and had no use for a home in Arcata, he decided to move the building across the bay to Eureka. The contractors set about the work. The house was moved to the marsh land near Arcata by the usual process of house-moving. Then a temporary staging and wharf were built. Over this the house was slowly transported to the water's edge, where two rock barges lashed together were in waiting to receive the structure. It was, after considerable labor, placed upon the barges, and then a tug-boat took them in tow, and in a few hours had covered a distance of seven miles and landed in Eureka. So well was the contract carried out that the only damage noted was a slight breaking of the plaster. The house is a fine two-story structure and is elaborately finished. When set upon Mr. Sevier's lot in Eureka it will be one of the finest residences in the city. When the house was being towed down the bay it represented a very novel sight, and hundreds of people went to the river-front to watch its progress. — *San Francisco Chronicle.*

Woman and the R. I. B. A. — When a young subaltern in the American Civil War rode up to General Grant in high glee to announce that his company had just taken a gun, Grant coolly turned his head, and said, "Then take another." This is the way the ladies are capturing one position after another in the battle of life, and as soon as they have captured one profession, they, without waiting to be told, try to capture another. Their last victory has been to effect an entrance into the Royal Institute of British Architects. At the last meeting, when the list of the successful candidates in the intermediate examination was read out, it contained the name of Miss Ethel Charles, who had presented herself for examination at that Institute. In the course of the evening a portrait was presented to the ex-president by Sir Arthur Bloomfield, who said it would be a long time before any individual would beat the record which the ex-president had established for hard work. "You will note," said the speaker, "that in alluding to the future possible record-breaker, I carefully guarded my character as a prophet by saying 'individual,' and not man, for do not the signs of the times warn us, or, rather, on such an evening as this, allow us to indulge in the hope that by that time the president of the Royal Institute of British Architects may be a lady? — *Illustrated Carpenter and Builder.*

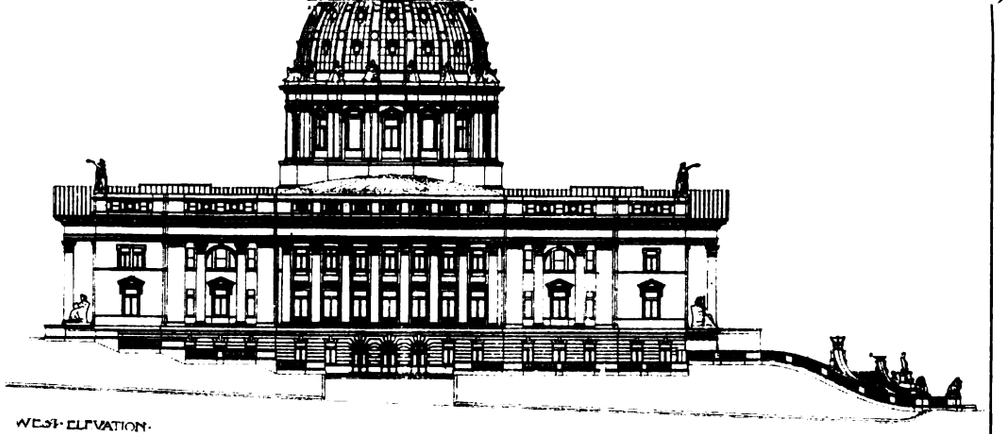
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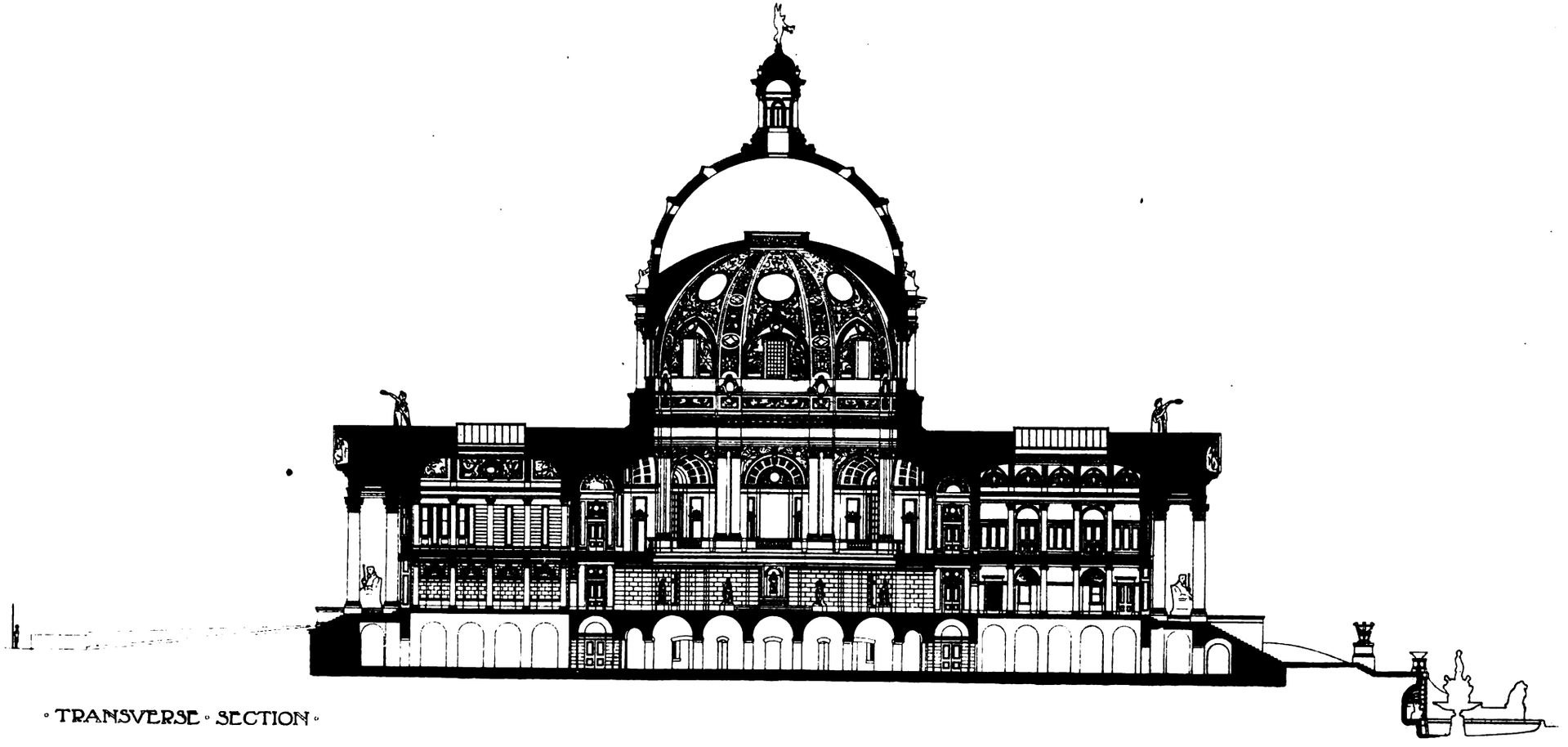
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REAR ELEVATION.



WEST ELEVATION.



TRANSVERSE SECTION.

HELIOTYPE PRINTING CO. BOSTON

DESIGN FOR THE MINNESOTA STATE-HOUSE, SUBMITTED IN THE SECOND COMPETITION.

WYATT & NÖLTING, ARCHITECTS.

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FRONT ELEVATION.



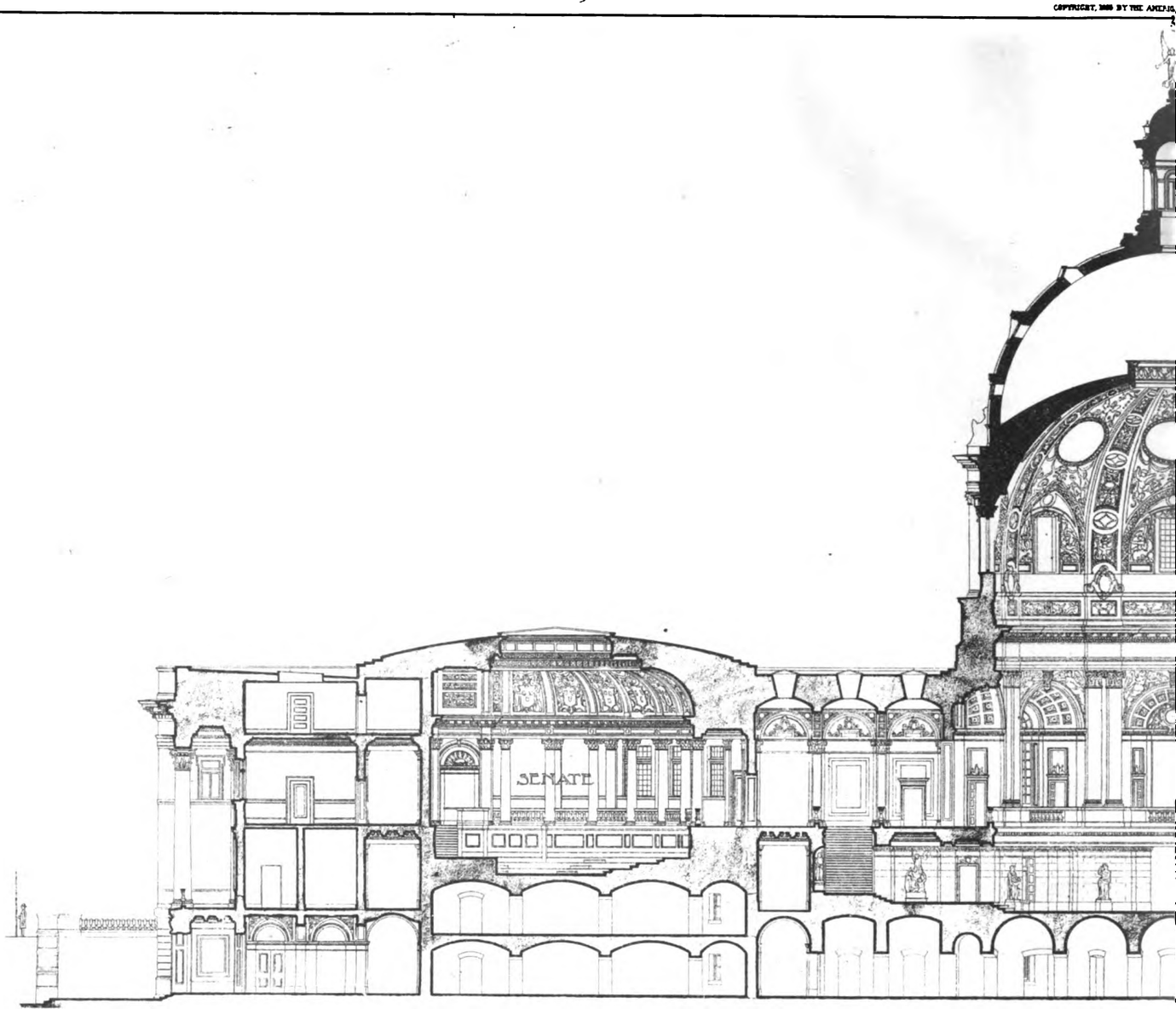


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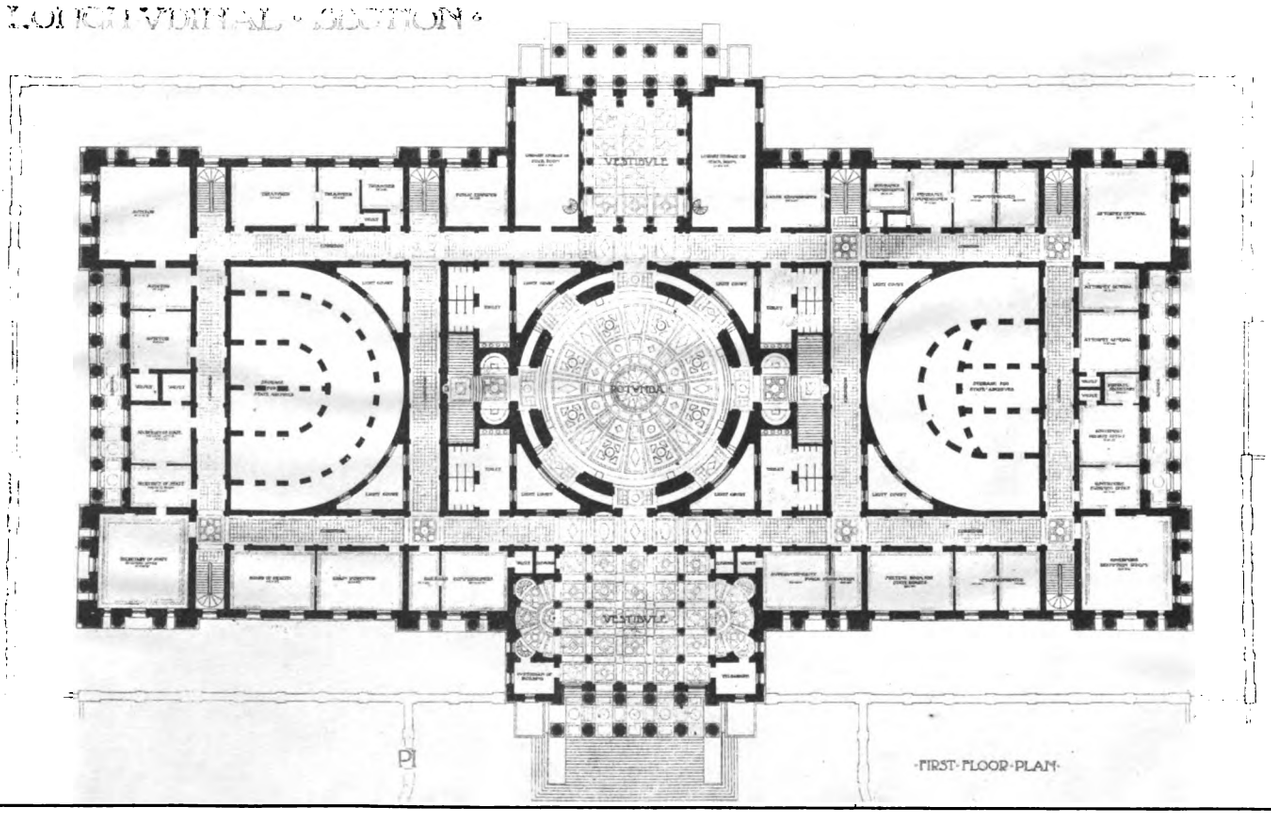
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LONGITUDINAL SECTION.



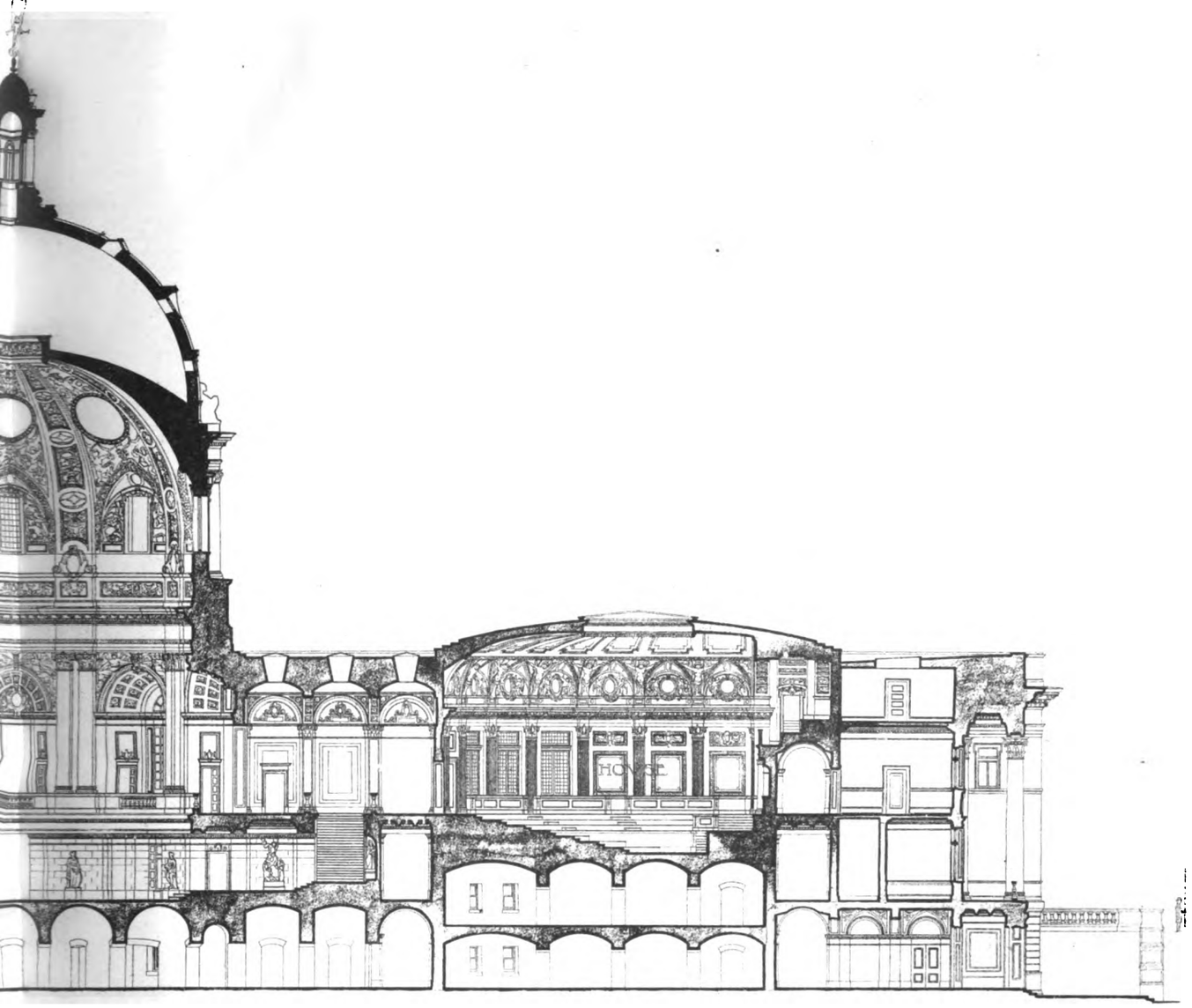
FIRST FLOOR PLAN.

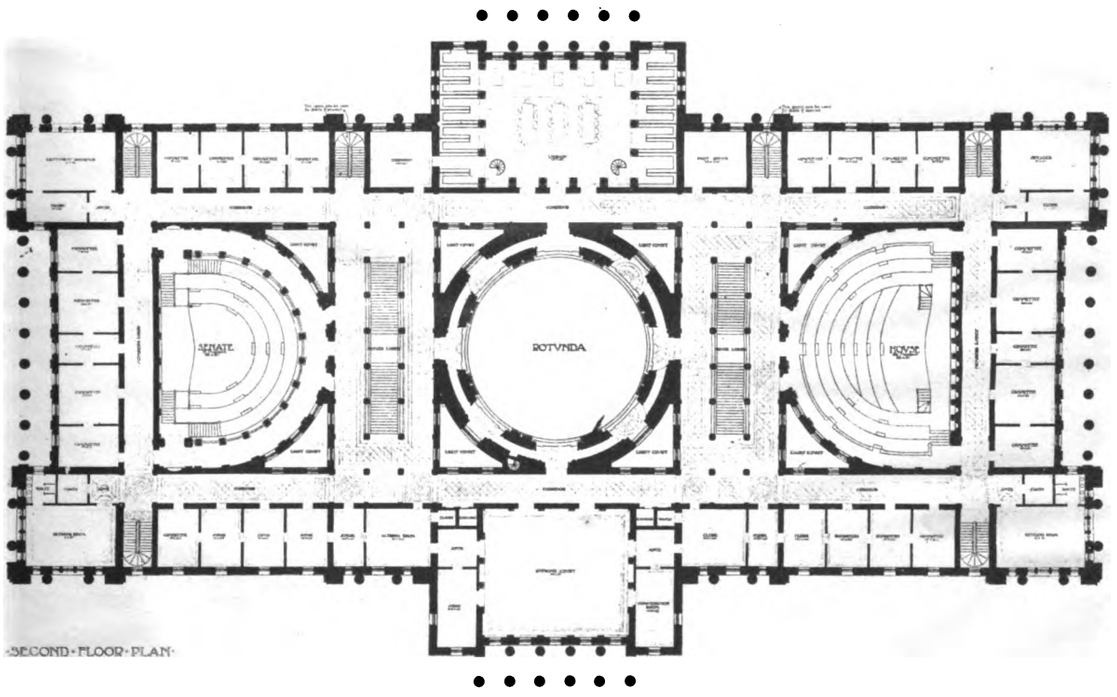
DESIGN FOR THE MINNESOTA STATE-HOUSE.

WYATT & NOLTI

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AMERICAN ARCHITECT & BUILDING NEWS CO.





SECOND FLOOR PLAN

HELIOTYPE PRINTING CO., BOSTON

E, SUBMITTED IN THE SECOND COMPETITION.

TING, ARCHITECTS.

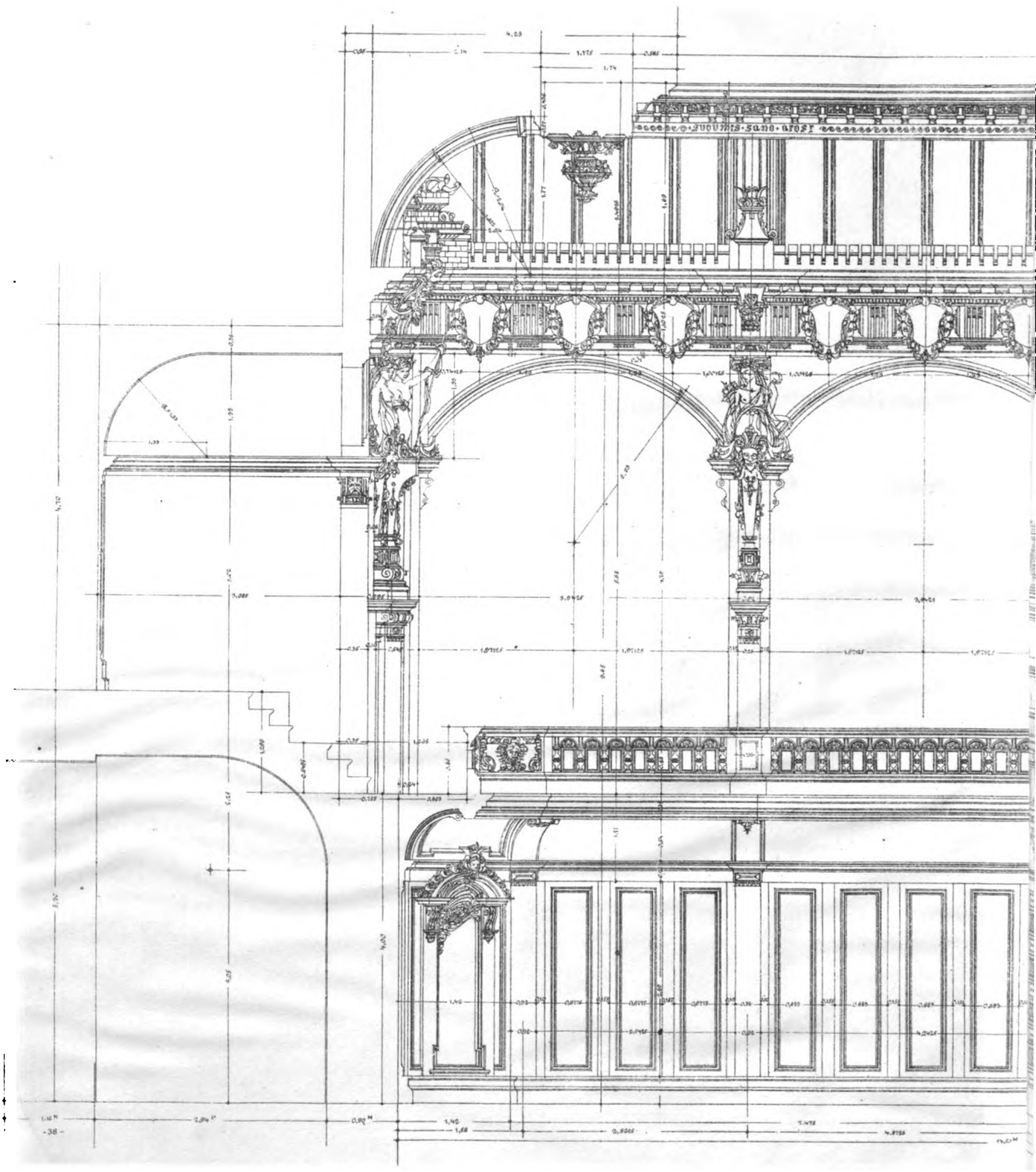
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Reichstagsbau.



DETAIL OF THE COUNCIL-CHAMBER: HOU

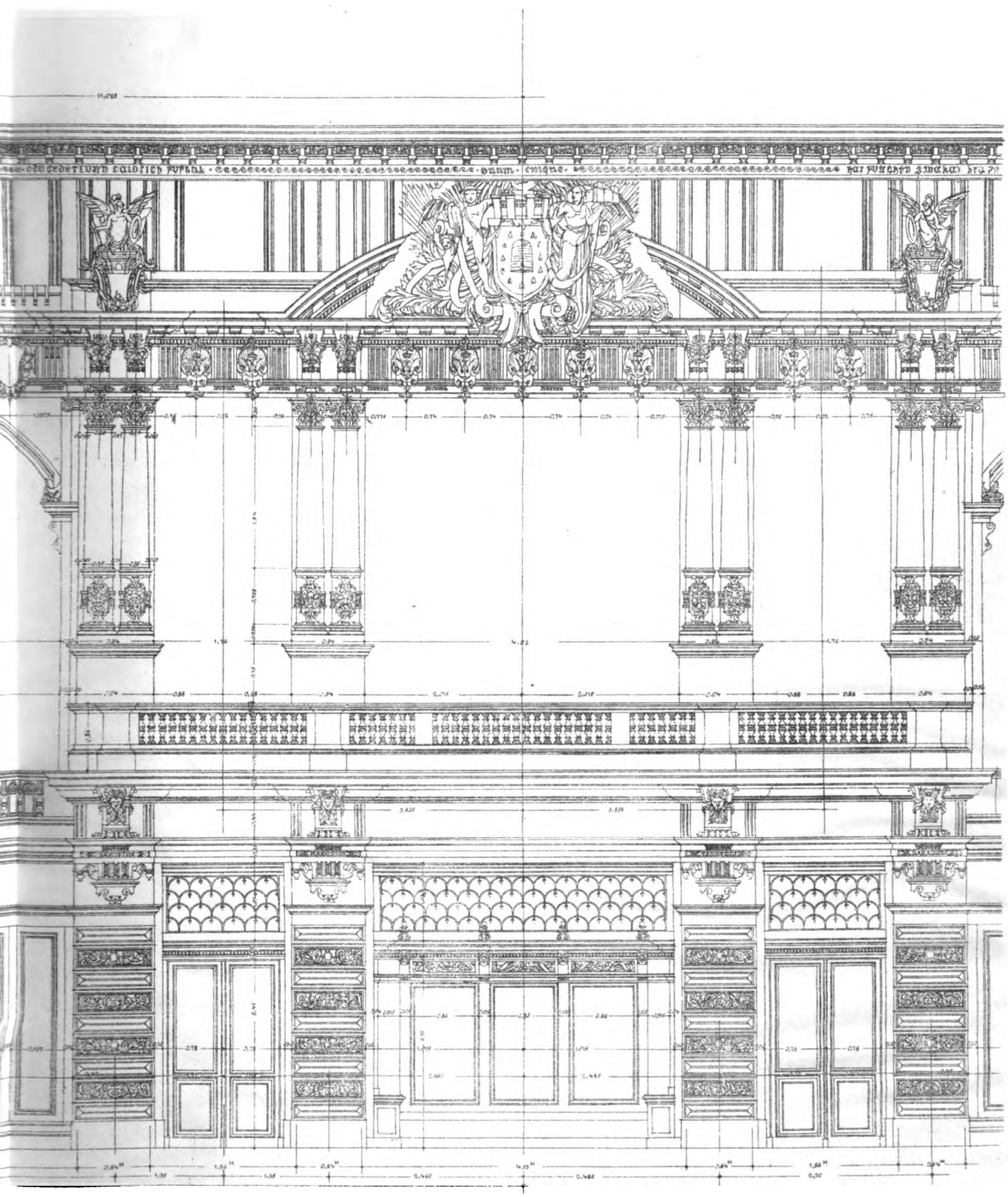
PAUL WALLOT,

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THE ARCHITECT & BUILDING NEWS CO.

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HELIOTYPE PRINTING CO. BOSTON

USES OF PARLIAMENT, BERLIN, PRUSSIA.

T. ARCHITECT.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 157. SATURDAY, JULY 6, 1895. Volume XLIX. No. 1019.

IMPORTANT NEWS ON WINDOW GLASS.



To Architects: —

Gentlemen, — The demand for our 26-ounce Crystal Sheet-glass has been so far beyond our expectations that we have been obliged to decline taking additional orders for some time. We regret exceedingly the disappointment thus caused and we are now preparing plans to largely increase our capacity for making this very fine glass, so that for contracts wanted in the early fall you need not hesitate to specify it, as we shall then be prepared to supply it promptly.

In this connection we desire to call your attention to our "Three Star," or First Quality Double Strength, which is a very good article, being superior in all respects to other American and foreign brands. It never fails to give satisfaction even at a trifle higher cost than other brands, as the difference in quality fully compensates the user.

We therefore make the following suggestions: — To those who want a good quality of glass, we advise that you specify "Chambers Eagle Brand" Three Star (or First Quality) Double Strength. When the very best sheet-glass obtainable is desired, we recommend that you specify "Chambers Eagle Brand" 26-ounce Crystal Sheet. Be particular to specify as directed, as cheaper brands may be substituted.

Our 26-ounce Crystal is superior to any sheet-glass made, and is packed with paper between the sheets to preserve the brilliancy of the surface. Each light is labelled "26-ounce Crystal Sheet." We also put a label on every light, of "Three Star" or First Quality.

If at any time you have reason to suspect that our genuine "Chambers Eagle Brand" has not been furnished, do not fail to notify us and we will be pleased to give you all the information possible.

CHAMBERS GLASS COMPANY,
Chicago, Ill.

GRAPHITE PAINT.

Twenty-five or thirty years ago the Dixon Company of Jersey City, N. J., who even at that time were known the world over as the largest manufacturers of graphite products, began the manufacture and introduction of graphite paint. Ticonderoga flake graphite was used and thoroughly ground in pure, boiled linseed oil. Roofs well painted with this paint did not require repainting for 10 to 15 or even 20 years. In time all this became a matter of record, and people recognizing the economy, as well as the durability of Dixon's Graphite Paint and its great superiority over mineral paints, demanded that their roofs should be painted with it. This demand, however, has led many painters to resort to sharp practices, or to make a graphite paint which they claim to be "equal to Dixon's." Some painters are unprincipled enough to offer as graphite paint a compound having the color of graphite, but composed of stove-polish, cheap black-lead, or even foundry-facings, mixed with oil. Other painters, honest in their intentions, but ignorant that there is a vast difference in graphite, have used ordinary commercial black-lead, ground with oil, expecting it would meet the requirements of their customers and prove lasting as the genuine Dixon Graphite Paint. So wide, however, is the difference in results, that experienced buyers insist on seeing the label on the package, or buy the paint themselves and have the painters apply it. Some time ago one of the departments of the U. S. Navy ordered 100 lbs. of Dixon's Graphite Paint of a well-known dealer. The dealer, not having that quantity on hand in an original package, filled a keg from a barrel of Dixon's paint and sent it forward. It was promptly returned by the Government officials with the remark, that they had experimented enough with other makes and would only receive original packages.

An experience covering a quarter of a century and over, has demonstrated that the pecular flake graphite, mined at Ticonderoga, gives the best results. When the paint is brushed out, each flake laps over its fellows, after the manner of fine fish scales, forming a covering of great elasticity and durability.

JOSEPH DIXON CRUCIBLE CO.,
Jersey City, N. J.

"OPEN DOORS."

"Open Doors" — "There are no secrets in making the best goods," is the title of the latest advertisement issued by Messrs. N. & G. Taylor Co., Manufacturers of American Tin-plate, Philadelphia. This house has long been noted for its novelties in trade literature, but the present circular is something above the ordinary, and is quite original and striking. It conveys at once its meaning.

The reader is confronted with the massive double doors of a factory, above which is the inscription "Open Doors," and underneath the words "There are no secrets in making the best goods." These two doors open at the touch, and bring immediately to view the interior of Messrs. N. & G. Taylor Co.'s Tinning house. This is a re-produced photograph by the half-tone process, and shows in reality the workmen, the tinning-stacks, tin-racks, dusting-boxes, etc. This Tinning house is the largest in the United States, and "with facilities to produce every grade of Bright or Roofing Tin that is made."

Twenty-two Tinning-stacks are shown that give an output of over 9,000 boxes weekly by day-work alone, but the most important thing that strikes the eye is a large hand printed in bright red, pointing to the tinning-stacks at the right foreground of the picture, to which is inscribed "The Genuine Taylor Old Style brand is made in the stacks shown on the right." Notice there is no shafting or machinery, the work being done entirely by hand, the same as in 1830, and here the "milk in the cocoanut" appears, and the whole import of the advertisement is quickly apparent.

In these days of mysterious manufacturing of Roofing Tin, N. & G. Taylor Co. boldly step forward and frankly invite inspection of their product. "Our Doors are open, there are no secrets in making the best goods." Their celebrated brand, the Genuine Taylor "Old Style" brand of Roofing Tin is made in Tinning Stacks that show no shafting, machinery or rolls. The work is done entirely by hand, the same as in 1830. No Acid Flux is used to injure the block sheets, pure Palm Oil only being employed. These sheets are allowed to soak, and are literally "boiled in oil" before they receive their metal coatings. Made in this way, without any secrets, and with "Open Doors," Messrs. N. & G. Taylor Co. may well advertise the brand which they originated so many years ago, and which they to-day hold as without a peer above their competitors. Jealousy and competition may go far in these days of close rivalry, but their brand, the Genuine Taylor "Old Style" is too well known and established in the hands of honest roofers to need any further encomium to praise its worth and durability.

N. & G. TAYLOR CO.,
Philadelphia, Pa.

The Enamelled Brick contract for the new Atwood Building, Chicago, has been awarded to the Tiffany Pressed Brick Company of that city, who also furnished them for the Marquette Building and are now furnishing them for the new Guaranty Building, Buffalo, N. Y.

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FIRE-BOX BOILER.

The Gurney Heater Mfg. Co., Boston, Mass., desire to call the attention of the trade to the cut which accompanies this article, illustrating a square fire-box boiler, which they have recently placed upon the market, and which they feel will commend itself upon sight, to any one familiar with the usual requirements of the heating trade. They further state that all the joints are made by means of screwed nipples, and are outside of the fire lines. The front and back sections of the boiler are made in single-cored castings, while the centre sections are made up in halves, nippled to the drums. It will be observed under this arrangement repairs may be readily made without disturbing any part of the boiler other than that which it is required to move.

The quality of the fire-surface applied in its construction is well understood, especially by those who have used the Gurney Steam Boiler, in which it has been the prominent feature.

The grate supplied with the heater is of the finger-bar rocking and dumping type, which has been so successful in heating work, and in case repairs are needed any grate-bar can be removed and replaced through the fire-door, without disturbing the entire grate.

The fire-box is large and generous, easily approached, while the surfaces above the fire may be reached from either the front or rear, for purpose of cleaning, and the surfaces being directly above the fire, the movement of the heat products is so rapid when the dampers are open, that the surfaces are almost, if not quite, self cleaning.

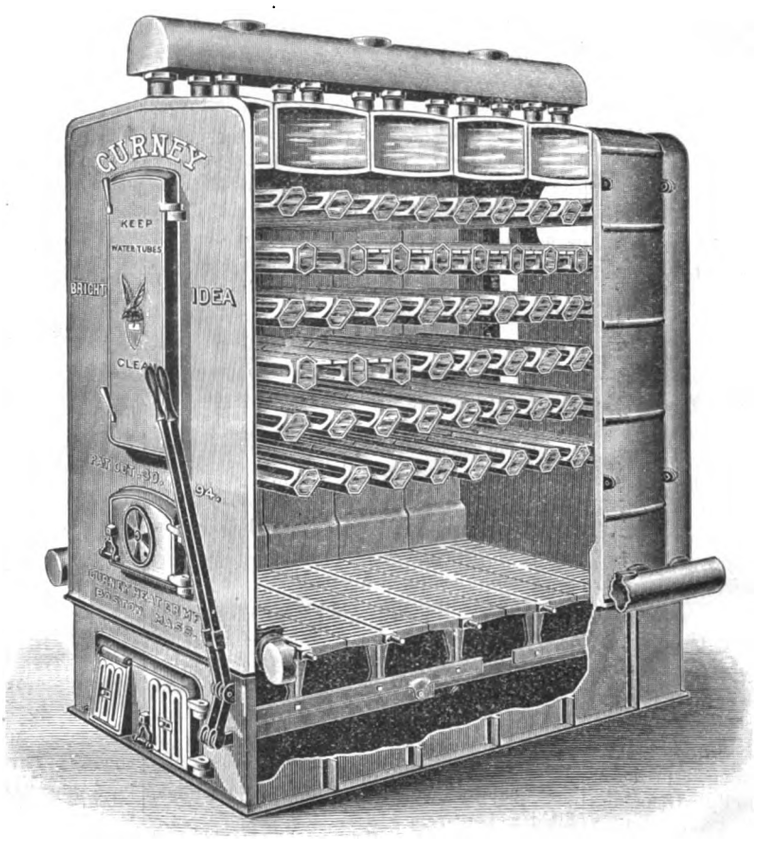
It will be observed that by the use of a series of webs cast upon each side of the heating-surface, deflecting flues have been created, one near the top of the boiler at back, and another at the front near the centre. The deflecting plates keep the fire from pursuing a direct line from the grate to exit flue; thus it will be observed that the fire comes in contact and acts directly upon a large number of water-tube surfaces, more or less staggered, until it reaches the last series but one, where it is compelled to pass to the front of the boiler into the flue described, and thence along parallel lines, amidst a series of other surfaces of similar character, to exit at the smoke pipe.

They have moreover endeavored to provide a simple, efficient and economical boiler, without return flues, and from the previous description it clearly shows that they have been successful, especially when all this has been done consistently with providing the apparatus at a reasonable cost to the trade.

Almost any kind of fuel of good quality can be used in these boilers; they are convertible and can be used for either steam or hot-water heating.

The Gurney Heater Mfg. Co. will be very glad to send one of their new catalogues, which fully illustrates this line of boilers, to the trade upon receipt of request.

THE GURNEY HEATER MFG. CO.,
BOSTON, MASS.



Gurney Fire-box Boiler.

PARADIGM SKYLIGHTS.

Following are thirteen reasons why engineers, architects and others may decide to adopt the new Patent "Paradigm" Skylight System.

1. The main bar being made of rolled steel, greater strength is necessarily obtained than in sheet-metal bars now being used all over the country.

2. The steel channel-bars are not exposed to the weather at all, being entirely and completely covered by the glass and "caps," and they can be kept painted and will last as long as the building.

3. The "caps" are the only part of the patent "Paradigm" Skylight System exposed to the weather, and as these can be made of strong copper, it will be readily conceded that a skylight or glass roof constructed on this system should outlast an ordinary skylight many years.

4. It is the most economical skylight system by reason of the fact that we can supply it at a price that will almost compete with the ordinary sheet-metal skylights. The cost of maintenance and repairs is reduced to a minimum.

5. As the steel channel-bar is so strong, averaging from one-eighth to one-quarter inch thick, a less number of roof purlins are required; for instance, purlins need not be less than five to eight feet on centres.

6. Broken panes of glass can be replaced more easily and quickly than by any other method.

7. The skylight bars are usually rolled in one length, up to forty feet if necessary, so that defects, through careless soldering and consequent leakage, as in the sheet-metal bars, is an impossibility.

8. The glass is all on a level and butted at joints. No ugly laps.

9. The method of carrying off the condensation formed on the under side of the glass is simply perfect.

10. A skylight or glass roof glazed on the patent "Paradigm" System, cannot get out of order. If no glass is accidentally broken there is no reason why the skylight should not last for a hundred years.

11. For the roofs of greenhouses, the "Paradigm" System of Glass Roofing cannot be excelled. All the wooden sash bars are done away with.

12. The method used for making a water-tight joint at the junction where two panes of glass meet, which permits the glass to be butted instead of being lapped, will commend itself to engineers and architects. The cross-bar is usually made of strong copper or other sheet metal.

13. The glass rests on the edges of the channel-bar, and should the iron contract or expand, the glass is out of harm's way, so that if the metal contracted or expanded one-quarter of an inch, (which, of course, is unlikely), still the glass would be uninjured.

The great trouble has been when glazing glass on iron (T-bars being generally used), the breakage from the above cause has been enormous.

We shall be pleased to submit plans and estimates for the erection of greenhouses, conservatories, winter gardens, portable iron buildings, etc.

PARADIGM CONSTRUCTION COMPANY,
NEW YORK, N. Y.

The Wilks Mfg. Co., Chicago, Ill., desire to report a very large trade on the Wilks Hot-Water Heaters. The late cold winter gave their heaters, put in in all parts of the country for house-heating, a good test, and giving the best satisfaction in every case, has started an increased demand for them for this purpose.

For house-heating, they have not heretofore been generally introduced, but have been well known and appreciated for many years for supplying hot water in all quantities. They also furnish an Improved Steam Generator for steam-heating, etc., and will be glad to furnish all information, catalogue, etc.

WOODWORK AND BUILDING-PAPER THAT WILL NOT BURN.

On May 4th last, a test was given as to the merits of the Electric Fireproof Process, as applied to a building-paper, woodwork and paint. An attempt was made to burn a small building 15 feet square by about 25 feet in height, built of different qualities of wood and thoroughly lined with Hubbs's Electric Fireproof Sheathing Paper and painted with the fireproof paint. The woodwork, paper and paint had all been treated by this process. The exhibition was given on Berkeley Oval, Irvington Street, Boston, and was an overwhelming success.

The building was subjected to a heat of

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2,000 degrees, and after being subjected to this intense heat for about one hour and forty minutes and everything that had been applied to the building in the way of shavings, cord-wood, kerosene, etc., had been consumed, the fire went out, leaving the building intact excepting where the glass had melted from the windows and where it had been slightly charred inside. In tearing some of the boards off in the inside of the building it was found that the building-paper had not even been discolored.

The test was witnessed by a number of people, prominent among whom were:—Fire Commissioners Fitch and Innis, Chief Webber, Ex-Chief Damrell (now Chief Inspector of Buildings), F. E. Cabot (Superintendent of the Boston Board of Underwriters), Mr. Edw. Atkinson (President of the Manufacturers Fire Ins. Co.), A. W. Straus, the local agent; Representatives of the U. S. Navy, the U. S. Postal Commission, the U. S. Electric Light Co. and the Bell Telephone Co. and many eminent Boston architects.

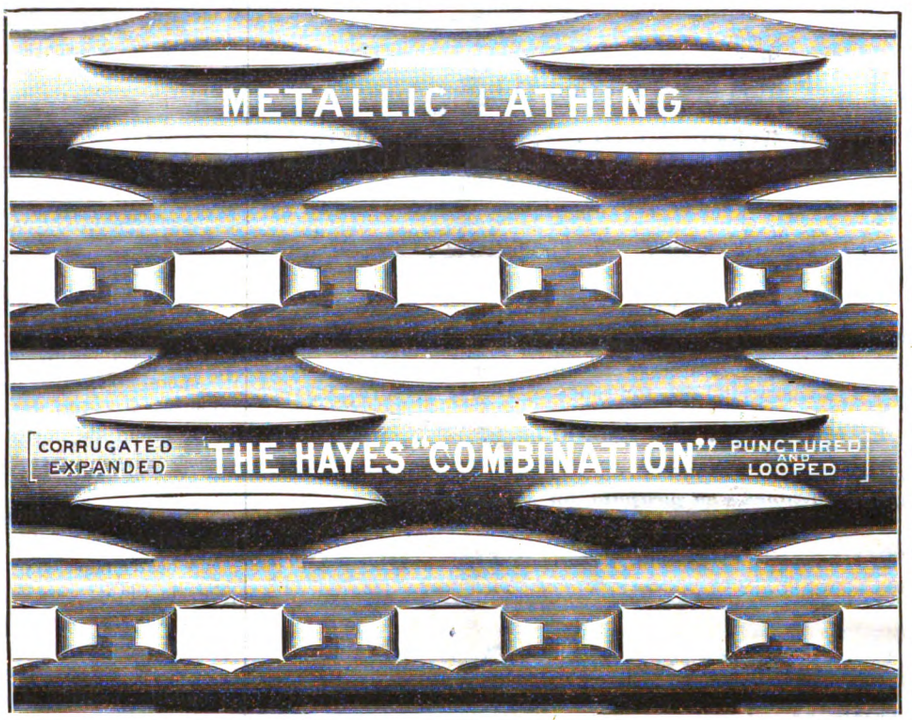
Mr. Max Bachart superintended the experiment and was congratulated without exception by all the officials present on the success of the test, and it was admitted that it was unnecessarily severe. Naval Constructor Hitchborn said, "the test was a success in every way," and he requested permission to walk over the floor that withstood fire so severe. He is of the opinion that this will immediately attract the attention of the Government, and perhaps be used in naval construction. Mr. Winslow, of Winslow & Wetherell (architects) said, it was the best he ever saw, and that stone or iron would have crumbled under such intense heat.

The building is in such good condition that it has been presented to the Boston Athletic Association in return for the many courtesies extended to Mr. Bachart during the week. It is gratifying to the manufacturers of the material used in the construction of the cottage to know that this building is the only wooden structure that has been erected and allowed to remain within the fire limits of Boston where fire laws are very stringent. This in itself is regarded as the highest praise that the Electric Fireproofing Process can have.

C. F. HUBBS & CO.,
36 BEEKMAN ST., NEW YORK, N. Y.

METALLIC LATHING.

ABOUT a year ago we illustrated a Metallic Lathing, which was invented by Mr. George Hayes of New York. It is corrugated, expanded and looped, a peculiarity from a sheet of metal, say 30″ x 46″, without any loss in area or thickness; while this lathing possessed such valuable features, effecting a large saving of material, which of necessity had hitherto been lost or taken up by the depressions and elevations contained in the corrugations. The explanation of this paradox is, that the metal taken up from the surface of the sheet by the corrugation is compensated for by the expansion of the slits into apertures. While perfection had apparently been accomplished, there was yet an important feature, which, if added, would most assuredly produce extra beneficial results and would, indeed, make it the acme of perfection, to wit: the Hooked and Lipped apertures, a well known feature of the Hayes Lathing which has been so largely and successfully adopted. Recognizing the great advantage of this most essential and well tried element, Mr. Hayes effected this useful combination, and it has already received a most substantial recognition by the trade. By his invention of most perfect machinery, he is enabled to lubricate, slit, puncture, corrugate, expand, loop and coat eighty square feet of this lathing per minute, in one operation and upon one machine, all ready for shipment. Indeed, this manufacture has assumed



a vigorous youth, having passed through but a very brief period of infancy.

This lathing is known on the market as "The Hayes Combination" and many thousand yards have been used. Mr. Hayes at the present time is engaged in constructing a large quantity of Solid and Hollow Partitions, notably in the "Metropolitan Life" and the "Vanderbilt Hospital" buildings, of from one to two-and-a-half inches in thickness. In many instances where this partitioning is used, it supersedes 8 or 12 inch brick walls, thus effecting a great saving of floor-space. It has been found perfectly practical to construct safes or fire-proof rooms of Metallic Lathing, plastered, and such construction has stood the test of 1,800 degrees Fahrenheit, that is, a heat in which iron will melt. Two hours after being submitted to that heat, its contents consisting of silk-paper, draft blanks, etc., were found to be absolutely uninjured. It therefore fulfilled all the requirements that could possibly be expected, and is found to be most reliable for the preservation of records and other valuable matters in county court-houses and other public buildings, bank vaults, etc.

A fire-proof room in a private dwelling is a very desirable and useful acquisition, and is attainable at a comparatively small cost.

GEORGE HAYES,
NEW YORK, N. Y.

PERAMBULATORY STEEL BATH-TUBS.

WE have an entirely new line of goods for you which are in universal demand and very profitable.

No modern home is complete without a bath-room, or at least a bath-tub.

In order to have a regular bathroom there must be a supply of water connected with the bath by pipes and a waste-pipe to carry off the dirty water. But thousands of families are not so situated that these can be had; they live in farm-houses, villages or small towns, or in other out-of-the-way places where there are no water-works or sewers. In such places the best thing that can be had for bathing purposes usually is a good portable bath-tub which can be brought into the bedroom or elsewhere when required for use, and then when out of use stowed away in some out-of-the-way place.

Heretofore no suitable bath-tub for this purpose has been made and sold, and it is to meet this requirement that we have brought out our new line of Portable and Perambulatory Bath-tubs.

By a Portable Bath-tub is meant one which can be carried about from place to place as required.

By a Perambulatory Bath-tub is meant a bath-tub which can be wheeled around anywhere, like a baby's carriage.

Our American Pattern Portable Bath-tub is 4 ft. 6 in., 5 ft., or 5 ft. 6 in. long by 26 in. wide over all, and 20 in. deep. It stands on iron feet, with side supports, and is capped on top with a comfortable, polished hardwood rim 3 in. wide, 1½ in. thick. The whole is decorated in Nile-green enamel and gold bronze. The body is made of either all galvanized steel, or steel lined with planished tinned copper, or of all copper.

Our American Perambulatory Bath-tubs are exactly the same as the Portable Tubs, only, instead of being mounted on feet, they are mounted on substantial trucks having rubber-tired wheels. These bath-tubs are very light, and when containing water for a bath can be wheeled about by a child.

Any of our regular stationary plumbers' bath-tubs can be made up portable or perambulatory.

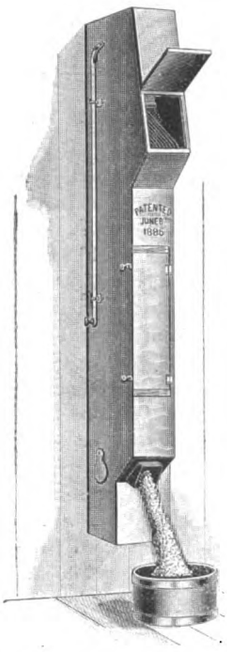
Weight, from 60 to 100 pounds. Prices, from $5 to $55 each.

Send for catalogue, price-list, and discount card, and you will find that you have struck something that you can make money out of.

THE STEEL BATH MFG. CO.,
DETROIT, MICH.

As high grade manufacturers, the Harrisburg Foundry and Machine Works, of

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Medal and Diploma

AWARDED THE

KASPER SELF-ACTING . . . OATS CLEANER,

BY THE

WORLD'S COLUMBIAN EXPOSITION.

In use in over 14,000 Stables.

Write for Testimonials and Prices.

THOMAS WHITFIELD,

369 Wabash Avenue,

CHICAGO, ILL.

Sole Owner and Manufacturer.

Any imitation or infringement of this device will be promptly prosecuted.

"CHARLES I DEMANDING THE FIVE IMPEACHED MEMBERS."

From the painting by

JOHN SINGLETON COPLEY, R.A.,

in the Boston Public Library.

A few copies of the excellent heliotype made of this fine historical picture, 11 x 16 inches, printed on heavy plate paper, 22 x 28 inches, with key to the portraits, are for sale.

PRICE . . . $3.00 each.

Sent carefully wrapped and postpaid, on receipt of price.

WALTER ROWLANDS, - - 211 Tremont Street, BOSTON.

BROOKS, SHOOBRIDGE & CO.

ARE MAKING THE . . .

Finest Ground Portland Cement

Imported into the United States.

Quick or Slow-Setting as Required.

WORKS:
GRAYS, ESSEX, ENGLAND.

NEW YORK OFFICE: 7 BOWLING GREEN.

CHARLES J. STEVENS, Agent.

Harrisburg, Pa., have gained a well deserved position in the Engine and Boiler world, and it will be to the direct advantage of all buyers to make themselves familiar with their fine types of Engines and Boilers.

SASH-CORD TESTS.

The tests shown in the following table are the results of a number of trials made with great care. The first quality goods of the most reputable manufacturers were used in each case.

The cost per window is figured on the basis of cost at which the goods can be bought of dealers, in full packages.

The breaking strength is shown, though as either device will hold ten times the weight actually required, it is not of great importance.

The wear was determined by hanging 24-pound window-weights over the best steel axle window pulleys, with turned face, outside diameter 2 inches by means of the chain, ribbon, or cord, as if in ordinary use in a window, and pulling the weight up and letting it down with a traverse motion of 18 inches. Every lift corresponds to once opening and shutting a window.

We think these tests may save your clients something in first cost as well as in trouble and expense afterwards.

STRENGTH AND DURABILITY TESTS.

Device for hanging Sash-weights.	Cost per Window.	Breaking Strength.			Wear.—Number of Lifts before breaking.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
		Lbs.	Lbs.	Lbs.			
Aluminum Bronze Sash Ribbon, (best quality, ⅝ inch wide).	$0.57	560	480	507	9,360	8,280	8,856
Steel Sash Chain, (best quality No. 1).	.70	550	540	545	52,200	20,400	35,616
Samson Spot Cord, (No. 10).	.24	570	545	558	52,320	35,760	46,632

SAMSON CORDAGE WORKS,
BOSTON, MASS.

TRADE-CATALOGUE.

A good trade-catalogue often contains much information that is valuable because of its general application and from the new catalogue just issued by the Gurney Heater Mfg. Co., we clip the following statements and recommendations, many of which deserve the title of apothegms:

"With all your getting, get a good chimney flue, without which all heaters are bad."

"A heater imperfectly cemented at the fire-joints in the course of erection should not work; it is against nature."

"Due care must be exercised to provide for any special conditions, such as exposure of building, material of construction, location and length and size of mains governing plant under consideration."

"Allowances should also be made for loose construction of doors and windows, which admit large volumes of cold air, also allow for outside doors, which are used frequently, and open directly into the room."

"The success of hot-water apparatus depends largely on the quality of coal, the height of chimney, and the rapidity of draught. It will always be found more economical, as regards the consumption of fuel, to work a large heater at a moderate heat than a smaller heater to its maximum capacity."

"One square foot of direct steam radiation will heat—

Bath-room, living-room, with two or three exposures, and a large amount of glass	40 cubic feet.
Living-room, one or two exposures with large amount of glass	50 " "
Living-room, one exposure, ordinary amount of glass	60 " "
Sleeping-rooms	55 to 70 cubic feet.
Halls	50 " 70 " "
Schoolrooms	60 " 80 " "
Churches and auditoriums of large contents, and high ceilings	65 " 100 " "
Lofts, workshops and factories	75 " 150 " "

"If indirect radiation be used, allow not less than fifty per cent more surface than for direct, and for direct-indirect twenty-five per cent more. In estimating the radiating sur-

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LOCALITY OF AUTHORSHIP OF DESIGNS
PUBLISHED IN THE AMERICAN ARCHITECT.

The assertion that the *American Architect* is a paper whose characteristics are *national* and not merely local is supported by the following table, which exhibits the manner in which several journals have treated domestic architecture In this comparison the IMPERIAL edition of the *American Architect* is considered, since the additional plates of the INTERNATIONAL edition are, in the main, illustrations of foreign work.

PAPER.	Number of subjects contributed.	Number of contributing architects.	Towns in which contributors were established.	States in which contributors were established.
No. I. . . .	214	109	28	16
No. II. . .	137	78	21	15
No. III. . .	118	56	16	11
Am. Architect.	267	152	47	24

In the first column, "subjects," only actual domestic work is included (foreign work, imaginative designs and the work of sketch-clubs are excluded), and the figures there given indicate that this number of designs might have been prepared by the same number of architects practising in the same number of different towns. The remaining columns show how nearly this ideal distribution has been reached in each case.

Architects practising in the State of publication furnished.				
Subjects.	Per cent of total number of subjects.	Different architects contributing.	Per cent of total number contributing architects.	Towns.
161	.752	75	.688	7
46	.335	24	.307	2
70	.593	22	.392	1
73	.273	39	.256	3

From this table it appears that Massachusetts architects—.256 per cent of the total number of contributors—provided only .273 per cent of the total number of designs published, percentages which, in view of the fact that Massachusetts is one of the most populous States in the Union, prove that they have not been accorded an unreasonable mount of our limited space.

PARQUET FLOORS
ASK FOR NEW CATALOGUE
S·C·JOHNSON,
RACINE,
WIS.
FOR FINISHING HARDWOOD FLOORS
— USE —
JOHNSONS PREPARED
— WAX & FILLER —

LUDLOW SAYLOR WIRE CO. No. 114 & 116 So. Fourth St. ST. LOUIS, MO.
Elevator Enclosures and Cabs,
Metal Work in Brass,
Wire and Wrought-Iron,
Office and Bank Railings,
Wire and Iron Fences, etc.

THE LAST WORD
ON
DOMES,
Alphonse Gosset's
'Les Coupoles d'Orient et d'Occident."
QUARTO IN PORTFOLIO.
Price, $12.00.
For Sale by the
AMERICAN ARCHITECT.

face, make due allowance for exposure of building, material of construction, location, length and size of main, location and capacity of boiler, also loose construction of doors and windows."

SIZES OF CHIMNEY FLUES MAY BE CALCULATED FROM THE FOLLOWING TABLE:

Total contents of building.	Average amount of direct steam radiation required.	Average amount of direct hot-water radiation required.	Size.	Area of chimney flues.
30,000 cu. ft. or less.	500 sq. ft.	750 sq. ft.	8 x 8	64 sq. ins.
45,000 " " "	750 " "	1,200 " "	8 x 12	96 " "
60,000 " " "	1,000 " "	1,500 " "	12 x 12	144 " "
90,000 " " "	1,500 " "	2,000 " "	12 x 16	192 " "
150,000 " " "	2,500 " "	3,500 " "	16 x 16	256 " "
210,000 " " "	3,500 " "	4,500 " "	16 x 18	324 " "

"Chimney flues for heating-apparatus should be ample in size, and carried as straight as possible from a point near cellar-floor to above the highest projection of roof. They should be clean and smooth inside. A well-jointed tile flue is better than a brick flue of somewhat larger area, the corners being of no value. The chimney flue should be carried three or four feet below smoke-pipe entrance, and provided with cleaning door at the base. This keeps the smoke-pipe clean, makes it last longer, prevents the clogging of chimney, and affords an easy means of removing the accumulated dust."

"Ventilating flues should be provided for in original plans. They should be located in inside walls or warm chimneys when possible. Every room that is to be warmed by indirect radiation *must* have a vent-flue to insure the entrance of warm air. The sizes of vent-flues for such rooms should be about one square inch area to twenty cubic feet of air-space.

"No definite rule can be given for sizes of vent-flues in rooms warmed by direct radiation, nor for schools, churches, or other buildings where many people congregate. If the architect or builder has not had practical experience in this direction, it will be well to consult some competent engineer who has made it a study."

In the line of specialties exhibited in this catalogue we note a convenient little "Defiance" steam-boiler adapted to use in dairies and large hot-water storage tanks for use in swimming baths and large laundries.

TRANSLUCENT FABRIC SKYLIGHTS.

WE are daily in receipt of inquiries as to whether Translucent Fabric can be set in metal frames for skylights. Lest there should be some doubt on this subject among architects, we wish to say that this can easily be done, and on application we will be glad to send drawings which illustrate the best forms of construction for our material.

TRANSLUCENT FABRIC CO.,
64 FEDERAL ST., BOSTON.

NOTES.

THE Goulds Mfg., Co., Seneca Falls, N. Y., report recent sales of their Triplex Power Pumps to the following:

Freydenburg Falls Paper Co., Plattsburg, N. Y., one 12″ x 12″, Figure 930, Pressure Pump to be used with grinders.

Jay Paper Co., Jay, Me., one 7″ x 8″, Figure 969, Stuff Pump to be used for pumping stuff.

Lewiston Foundry & Machine Co., Lewiston, Pa. Two 1¼″ x 2″, Figure 1,009, Triplex Power Pumps for boiler feeding.

Tide Water Oil Co., Bayonne, N. J., three 4″ x 6″, Figure 924, Triplex Power Pumps two of these to be used for pumping oil and one for pumping water, one 1⅞″ x 6″, and one 2½″ x 6″, Figure 999, which are to be used for pumping ammonia.

Standard Oil Co., of New York, Olean, N. Y., Refinery, two 8″ x 12″, Figure 957, Triplex Power Pumps for water-supply.

P. H. Potter, Springfield, Mass., one 4″ x 6″, Figure 924, Triplex Power Pump for boiler feeding.

Worcester Engineering Co., Worcester, Mass., one 12″ x 12″, Figure 920, Triplex Power Pump for water-works system at Millbury, Mass.

GOULDS MFG. CO.,
SENECA FALLS, N. Y.

ONE of the most artistic trade publications that has ever come before us is a little pamphlet just issued by the H. W. Johns Mfg. Co., of New York, intended to present the effects that may be secured by the use of their asbestos paints. The color printing is executed with uncommon delicacy and there are several of the plates that are perfect models of architectural rendering in color, and draughtsmen would be wise in securing a copy of the pamphlet for study and reference.

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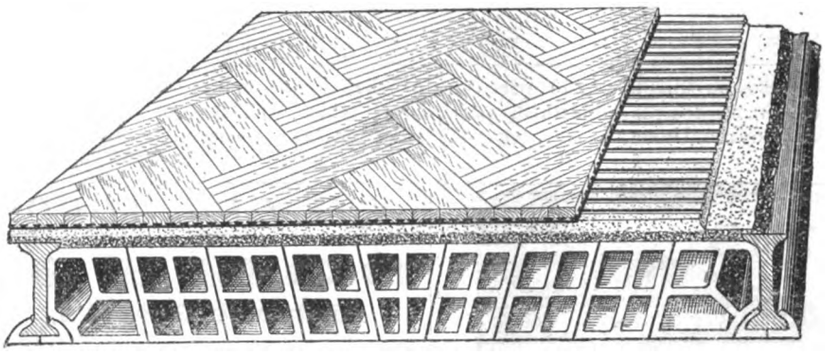
WOOD-BLOCK FLOORING.

JAMES G. WILSON'S SYSTEM.

PATENTED IN THE UNITED STATES, ENGLAND, GERMANY AND FRANCE.

INDESTRUCTIBLE. Perfectly solid. Noiseless and warm. Possessing complete sanitary advantages of imperviousness to dry-rot, virmin, dirt and disease germs, damp and draughts, etc. Admirably adapted for use in public and private buildings, such as hospitals, colleges, schools, churches, banks, hotels, warehouses, stores, railroad stations, residences, restaurants, armories.

An Ideal Floor. — Every block is firmly and completely anchored to the concrete foundation by a bituminous compound which not only serves as a damp and vermin-proof course, but forms also a double dovetail key, binding the wood floor and concrete foundation into one solid, immovable and unshrinkable structure.



Wilson's Wood-block Floor on Holland Tile.

The primary requisites of a good floor are that it should be firm, level and durable, impervious to the passage of sound, dust, draught, foul odors, vermin and disease germs. These requisites a boarded floor of the ordinary type, whether double or single, can never possess.

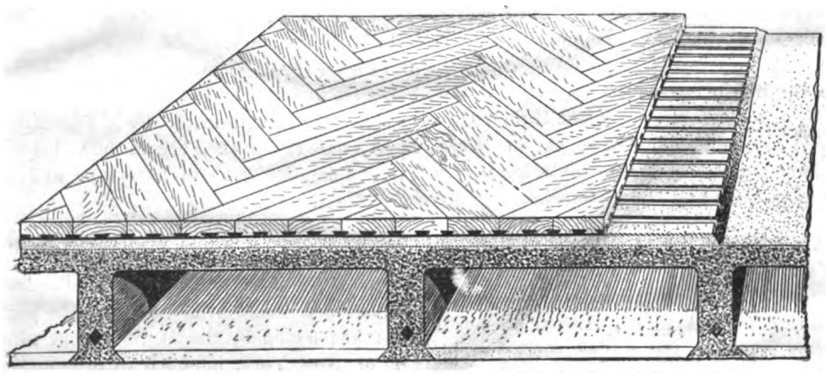
The "Block" Floor laid upon a Cement foundation has, after many years of trial, become the standard in England (where it first originated), as well as in all the chief European countries. It must, however, be understood that the "Block Floor" is only successful when it is properly laid, and that when laid by unskilful and inexperienced people, with improper and unsuitable materials, and above all with a disregard to the effectual anchorage of the blocks to the concrete foundation, it will always be, as it has been under such circumstances, a dead failure.

The Problem of Compound Floor Construction. — An English expert who claims to have laid five million square feet of this flooring, writes as follows in a pamphlet recently issued:

"The difficult problem presented in the construction of compound floors of this description has always rested mainly on the points — how to obtain perfect bond or connection between the wooden blocks themselves, and how to obtain a perfect and enduring cohesion between the concrete and cement substratum and the superimposed wooden blocks. The second point is the more difficult to solve. Wooden blocks not adhering to concrete, it has therefore been sought to obtain cohesion by interposing a layer of asphalt adhesive cement. This expedient partly meets the difficulty, as it is true that wood will adhere in some degree to asphaltic cement when placed upon the latter whilst hot, and before it is set. The whole of the difficulty, however, is not removed, for the asphalt itself has no sufficient or permanent adhesion to concrete, in fact *there is simply no cohesion at all between the two materials.*"

The difficulty referred to above is effectually overcome by the "double key" anchorage shown in section, whereby each and every block is securely fastened to the foundation, and is indisputably immovable.

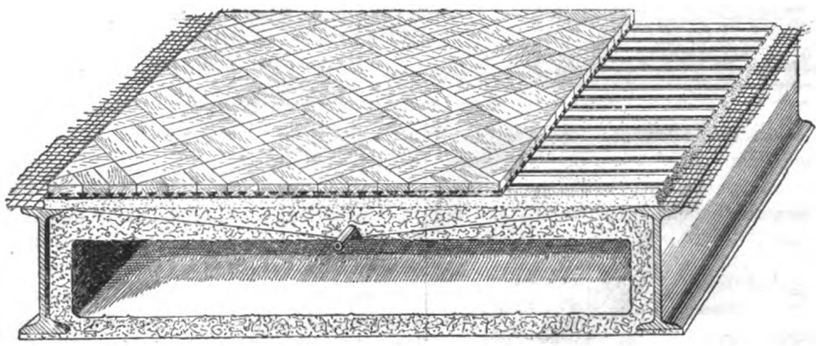
How Not to do It. — Where the blocks are laid without an anchorage to the Concrete, trusting only to the adhesion of the bituminous compound, the result is simply a wood carpet, possessing none of the valuable characteristics of the genuine Block Floor, and which will soon begin to break up. Any attempt to repair is almost useless, and it will generally be found cheaper to remove the entire floor and relay it properly.



Wilson's Wood-block Floor on Ransome's Patent Concrete Floor.

Preparation of Blocks. — The wood blocks of which this floor is built up are made about 18 inches long and from 2½ to 3 inches wide, varying in thickness from 1 inch to 1½ inches. They are made from carefully selected, well seasoned, and thoroughly kiln-dried lumber, and are moulded and cut up by machinery designed and built especially for the purpose, insuring such an absolutely mathematical exactness that when laid they fit together with an accuracy that makes the joints almost imperceptible.

Method of Laying Floor. — The foundation for this floor may be of any fireproof material, such as Brick, "Terra-Cotta Tiles," or coarse Concrete. When this is dry, and a few days before the wood floor is to be laid, the top or finishing layer of Portland Cement Concrete, from ¾ inch to 1½ inches thick, is floated on and brought to a dead level. While this is still plastic, an implement, which may be called a multiple plow, is run over the surface and cuts out, with perfect exactness, the parallel dovetail channels, which form the anchorage for the blocks. The action of the implement being very rapid, the cost of this process is trifling and is included in the price of flooring. The surface thus prepared is permitted to dry, and when it is hard the hot Bituminous Compound is poured on, entering and filling up the channels in the Concrete, and overflowing the surface to the required thickness; into this hot Compound the Wood Blocks are pressed, and each and every block is thus separately and immovably anchored to its foundation.



Wilson's Wood-block Floor on Metropolitan Co.'s System of Floor Construction.

TESTIMONIALS.

EAST ST. LOUIS, ILL., May 21, 1895.

J. G. WILSON, ESQ.,
74 West 23d St., New York, N. Y.

Dear Sir, — We are very much pleased with your patent Wood Block Floor which has been laid in our new Public Library Building, and are quite willing to state to you some of the many excellent points, as they appear to us, which it possesses, as well as the reasons which induced us to adopt it. First, our building is fireproof, and we desired to obtain a floor which, when laid on the hard, unyielding surface of cement, would give us an elastic and easy tread. Second, we desired to secure a floor which would be a perfect sanitary floor, so close and tight in the joints that it would not only be dust-proof, but practically water-tight as well. Third, we wished to secure a floor that gave promise of wearing qualities; that would be practically noiseless and free from reverberation when walked over; and which, when finished, would be in harmony and perfect keeping with the other first-class interior appointments of our building.

Your floors seem to possess all of these requisites, the only question that arose being, Will your method of laying be lasting and permanent? This question was satisfactorily answered by subjecting a section of the floor to sunshine and shower, to heat and to cold; a

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square of it was exposed to the heat of the sun all last summer and through the fall and winter without a single indication of parting of the wood from the cement or of opening at the joints. The possibility of rising or of swelling at the joints is provided for and avoided by the dovetail grooves cut in the cement foundation and likewise in the under surface of the blocks, and once put in place there would seem to be no possible chance for buckling or becoming loose, which so frequently happens to marble or tile floors.

Very respectfully yours,
TH. NELSON, *Librarian.*

NEW YORK, May 20, 1895.

MR. J. G. WILSON.

Dear Sir, — We have now been in our building for just a year, and we find that your Wood Block Flooring, laid on our ground-floor and basement is very satisfactory — i n d e e d, we believe that it is the best flooring made.

Yours truly,
CHARLES SCRIBNER'S SONS, *Publishers,*
153-157 Fifth Ave., between 21st and 22d Sts.

JAS. G. WILSON,
NEW YORK.

THE Goulds Co., 22 North Canal Street, Chicago, Ill., has closed a contract with the City of Oregon, Illinois, for an electrical pumping plant to consist of one Gould's Triplex Power Pump, Figure 920, size 10″ x 12″, having a capacity of 500 gallons per minute. The pump will be operated by electric motor.

BUILDING INTELLIGENCE.

Reported for the American Architect & Building News.

ADVANCE RUMORS.

Arkansas City, Kan. — The Santa Fe shops, recently burnt, will probably be rebuilt of stone as soon as possible.

Arlington, Mass. — The town has appropriated $38,000 for a new grammar school-house on Winter St.

Baltimore, Md. — The Methodists will build a stone church, 79′ x 82′, at the s w cor. North Ave. and Caroline St.

The Boys' Home Society will build a four-st'y addition to the Boys' Home, n w cor. Calvert and Pleasant St.

Easthampton, Mass. — The plans of Putnam & Bailey, of Northampton, have been accepted for a $15,000 school-building in the village of Nashawannuck.

Kingston, N. Y. — The Cunningham Mfg. Co. will build a two-st'y brick factory, 35′ x 125′.

Manson, Ia. — F. C. Wherry, of Fort Dodge, has made plans for a $12,000 school-building.

New Haven, Conn. — The Grand Ave. Baptist Church will build only a portion of their new edifice now, at a cost of about $10,000. The architect is E. E. Benedict, of Waterbury, and the section to be put up at present will provide for the Sunday School, mainly. It will be of brick, 42′ x 71′, with slate roof.

Norwich, Conn. — F. S. Newman, of Hartford, will be the architect of the new G. A. R. Post building, which will be of brick, stone and terra-cotta, and cost about $20,000.

Oxford, Mass. — M. E. Taft & Son are to build a two-st'y brick and stone woolen mill.

Philadelphia, Pa. — Cope & Stewardson have completed plans and specifications for the new dormitories for the University of Pennsylvania. These are now on board for estimate and contemplate a large block of buildings, which will be four stories high, except at corners and centres where they are five. Brick, iron and stone construction, tin, copper and slate roof.

Thompsonville, Conn. — The Lozier Mfg. Co., now of Toledo, O., will move their plant here and build a three-st'y, 200′ x 400′, factory building.

APARTMENT-HOUSES.

Boston, Mass. — *Washington St.*, cor. School St., Ward 23, four-st'y brick apart. and store, flat roof, 75′ x 85′, own. and bld., D. F. & W. B. Littlefield.

Chicago, Ill. — A. Hood, two-st'y brick flats, 6545-6547 Oglesby Ave.; $13,000.

J. Endler, two-st'y brick flats, 3444 S. Western Ave.; $3,000.

Jas. E. Reynolds, two-st'y brick flats, 514 Oakley Ave.; $5,000.

Jno. Katzenor, three-st'y brick flats, 1194 Wilton Ave.; $6,000.

Geo. Lyons, three-st'y brick flats, 5019 Calumet Ave.; $6,000.

Newark, N. J. — *Third St.*, near Central Ave., three-st'y frame flats, tin roof; $4,000; own., James Bradley; arch., A. Connelly, 766 Broad St.

New York, N. Y. — *Amsterdam Ave.*, 75′ 11′ n 106th St., 2 five st'y brick flats, 25′ x 86′, 58′ high, flat tin roofs; $50,000; own., Jos. Silverman, 59 West 89th St.; arch., G. F. Pelham, 503 Fifth Ave.

Monroe St., Nos. 51-53, 2 five-st'y brick flats, 25′ x 88′, 59′ high, flat tin roofs; $36,000; own., Andrew Martin, 96 Madison St.; arch., Joseph Wolf, 1 Madison Ave.

One Hundred and Forty-third St., n s, 250′ e 8th Ave., five-st'y brick flats, 25′ x 89′, 58′ high, flat tin roof; $40,000; own., Joseph Silverman, 59 West 98th St.; arch., G. F. Pelham, 503 Fifth Ave.

Hester St., s e cor. Orchard St., five-st'y brick flats, 25′ x 40′, 69′ high, flat tin roof; $20,000; own., Henry Lewis, 26 East 109th St.; arch., Charles Rentz, 153 Fourth Ave.

(Apartment-Houses Continued.)

Columbus Ave., e s, 50′ 4″ South 109th St., five-st'y brick flats, 25′ x 89′, 55′ high, flat tin roof; $20,000; own., Bernard Cohen, Wolf Endel, 106 West 86th St., 333 West 55th St.; arch., Marsh, Israels & Harder, 294 Broadway.

One Hundred and Thirty-second St., 90′ e 5th Ave., 2 five-st'y brick flats, 25′, 20′ x 83′, 83′, 40′ high, flat tin roofs; $45,000; own., Louis Wirth, 72 West 114th St.; arch., John Hauser, 1441 Third Ave.

One Hundred and Thirty-third St., s e cor. 5th Ave., e s 5th Ave., 25′ South 133d St., 4 five-st'y brick flats, 24′, 25′ x 77′, 86′, 59′ high, flat tin roofs; $105,000; own., Louis Wirth, 72 West 114th St.; arch., John Hauser, 1441 Third St.

One Hundred and Thirty-second St., n e cor. 5th Ave., e s 5th Ave., 250′ n 132d St., 4 five-st'y brick flats, 24′, 25′ x 86′, 97′, 59′ high, flat tin roofs; $130,000; own., Louis Wirth, 72 West 14th St.; arch., John Hauser, 1441 Third Ave.

One Hundred and Thirty-second St., n s, 90′ e 5th Ave., 2 five-st'y brick flats, 20′, 25′ x 83′, 86′, 59′ high, flat tin roofs; $45,000; own., Louis Wirth, 72 West 114th St.; arch., John Hauser, 1441 Third Ave.

Leroy St., No. 4, five-st'y brick flats, 25′ x 79′, 60′ high, flat tin roof; $20,000; own., Chas. B. Cross, 10 West 39th St.; arch., Geo. F. Pelham, 503 Fifth Ave.

One Hundred and Fiftieth St., n w cor. 3d Ave., five-st'y brick flats, 28′ 10″ x 12′ 11″, 60′ high, flat tin roof; $18,000; own., Wm. Ebling, 935 Prospect Ave.; arch., Michael Garvin, 3311 Third Ave.

Lenox Ave., w s, 75′ s 114th St., five-st'y brick flats, 25′ 2½″ x 64′, 58′ high, flat tin roof; $16,000; own., Thomas R. White, 640 Madison Ave.; arch., J. H. Valentine, 217 West 125th St.

Delancey St., Nos. 279-281, five-st'y brick flats, 35′ x 65′, 89′ high, flat tin roofs; $28,000; own., Herman Werthheim, 22 Willett St.; arch., Max Muller, 21 Centre St.

West Thirty-fourth St., Nos. 430-434, 2 five-st'y brick flats, 29′ 10½″ x 86′ 4″, 60′ high, flat tin roof; $60,000; own., Warren S. Williams, 325 East 68th St.; arch., Ralph S. Townsend, 1300 Broadway.

St. Louis, Mo. — Flats, s s Lucas St., bet. 13th and 14th Sts.; $30,000; own., E. O. Whistler; bld., R. P. Mofluor.

Apart., n s Washington St., bet. 13th and 14th Sts.; $4,000; own., E. O. Whistler; bld., R. P. Mofluor.

Flats, s s Bell St., bet. Whittier and Pendleton Sts.; $6,000; own. and bld., Culp Bro.

CHURCHES.

Butler, Pa. — Brick Grace Lutheran Church; arch., F. C. Sauer, 91-93 Fifth Ave., Pittsburgh.

Homestead, Pa. — Buff brick S. Mary Magdalen's Roman Catholic Church, stone trimmings, two spires, slate roof, trimmed with galvanized iron and copper; arch., F. C. Sauer, 91-93 Fifth Ave., Pittsburgh.

HOUSES.

Baltimore, Md. — Three-st'y brick dwell., s e cor. Forrest and Ensor St.; own., Aug. Dennenberg, 530 Forrest St.

Five two-st'y brick buildings, e s Patterson Park Ave., and 5 two-st'y brick dwells., n s Preston St., beg. n e cor. Patterson Park Ave; own., Geo. F. Littlejohn, 1533 Bolton St.

Four three-st'y brick dwells., n s Bradley St., bet. Boune and Abell Sts.; own., Jno. Murray.

Two three-st'y brick dwells., n s Raborg St., bet. Pine and Fremont Sts.; own., G. E. Warfield, 110 St. Paul St.

Fourteen two-st'y brick dwells., beg. s e cor. Chester and Preston Sts.; own., Geo. C. Goldman, 1121 N. Broadway.

Three-st'y brick dwell., 1117 Lanvale St.; own., J. W. Putty, 1501 Edmondson Ave.

Five two-st'y brick dwells., s s Glyndon Ave., and 5 two-st'y brick dwells., n s James St., w Carey St.; own., D. G. Bockelman.

Three-st'y brick dwell., w s Eutaw Pl., s Brooks Lane; own., J. R. Shaw.

Five two-st'y brick dwells., Hunter's Alley, n 21st St.; own., Eliz. Oudesluys, 803 N. Eutaw St.

Four two-st'y brick dwells., w s Pulaski St., s Baltimore St.; own., Wm. M. Warfield, 845 Hollins St.

Twelve two-st'y brick dwells., w s Castle St., n Madison St; own., Wm. C. Dorsey, 2035 Ashland Ave.

Nine three-st'y brick dwells., s s Park Terrace, beg. s e cor. Druid Hill Ave.; own., Jas. B. Yeatman, Liberty Road and Forrest Ave., Walbrook.

Four three-st'y brick dwells., e s Eutaw Pl., n North Ave.; own., Chas. F. Stein, 2408 N. Calvert St.

Six two-st'y frame dwells., n s Morling Ave., w Conduit St.; own., W. D. Marks, 510 Fifth Ave., N.

Two-and-a-half-st'y frame dwell., 24′ x 28′, s s Hunt's Lane, e Pimlico Road; own., Wm. F. Ludwig, Shirley Lane.

Boston, Mass. — *Walnut Ave.*, near Rockland St., Ward 21, 2 three-st'y brick dwells., flat roof, 23′ x 43′; own. and bld., B. J. Connelly.

Lenox St., No. 15, Ward 19, three-st'y brick and stone dwell., flat roof, 19′ x 34′; own. and bld., Mrs. A. T. Connelly.

Cobden St., near Washington St., Ward 24, 4 three-st'y frame dwells., each 22′ x 78′, flat roofs; own., Alice Walsh; bld., McKay Bros.

Commonwealth Ave., near Kenmore St., Ward 22, 3 four-st'y brick dwells., each 25′ x 62′, flat roofs; own. and bld., L. M. Morrill.

Foster St., No. 11, Ward 6, three-st'y brick dwell., 44′ x 24′, flat roof; own., M. Milano, *et als.*; bld., Maloney & Brown.

Vernon St., No. 116, Ward 19, three-st'y brick dwell., 44′ x 61′, hip roof; own., J. J. Williams, bld., Herman Drake.

Park Lane, near Walnut Ave., Ward 23, three-st'y frame dwell., 42′ x 31′, pitch roof; own., T. J. Stearns; bld., M. A. Blanchard.

Newman St., Nos. 50-52, Ward 15, 2 three-st'y frame dwells., each 18′ 9″ x 40′, flat roofs; own. and bld., J. P. Rogers.

Murdock St., near Cypress Road, Ward 25, three-st'y frame dwell., 24′ x 54′ 6″, pitch roof; own. and bld., A. C. Fraser.

Park St., near Montview St., Ward 23, three-st'y frame dwell., 31′ 2″ x 37′ 2″, hip roof; own., C. W. Whittemore.

Cook St., near Washington St., Ward 24, three-st'y frame dwell., 25′ x 60′, pitch roof; own., Thomas Fee; bld., McKay Bros.

Carruth St., Ward 24, two-and-one-half-st'y frame dwell., 30′ x 40′, gambrell roof; own., Miss F. M. Bethune; bld., John Kellar; arch., Loring & Phipps.

(Houses Continued.)

St. Alphonsus St., near Conant St., Ward 22, three-st'y frame dwell., 26′ x 27′, flat roof; own., Henry Bletser; bld., W. A. & H. A. Root.

Galena St., No. 16, Ward 21, three st'y frame dwell., 24′ x 51′, flat roof; own., E. M. Stanten; bld., R. D. Ward & Co.

Howard St., near Dorchester Ave., Ward 15, three-st'y frame dwell., 24′ x 54′, flat roof; own., C. Dirkmeyer; bld., Fuchs & Wangler.

Barrington St., near Speedwell St., Ward 24, frame dwell., 25′ x 42′; own., D. R. Graves; H. P. Oakman's Sons.

Calumet St., near Delaware St., Ward 22, three-st'y frame dwell., 25′ x 52′, pitch roof; own., F. Sullivan; bld., J. W. Kelley.

Baker Park, Nos. 18-20, Ward 20, three-st'y frame dwell., 22′ x 40′, pitch roof; own., Dorchester Associates; bld., A. D. Gould.

School St., near Washington St., Ward 23, 2 three-st'y frame dwells., 21′ 6″ x 61′, flat roofs; own., T. J. Croft; bld., D. Melsaac.

Lay St., near East 4th St., Ward 14, three-st'y frame dwell., 20′ 6″ x 46′ 6″, flat roof; own., S. E. Paige; bld., C. A. Hammond.

Wildwood St., near Ballou Ave., Ward 24, 2 three-st'y frame dwells., each 26′ x 30′, pitch roofs; own. and bld., C. F. Monk.

Wildwood St., near Ballou Ave., Ward 24, 3 three-st'y frame dwells., each 25′ x 40′, pitch roofs; own. and bld., C. F. Monk.

Terrace St., near Oscar St., Ward 24, three-st'y frame dwell., 29′ x 27′, flat roof; own., Minnie Darshuk; bld., J. Luippold.

Horace St., near Byron St., Ward 1, two-st'y frame dwell., 22′ x 50′, flat roof; own. and bld., Doyle & Forshner.

Jefferson St., near Bunker Hill St, Ward 3, three-st'y frame dwell., 21′ 9″ x 41′, flat roof; own., David Barrett; bld., D. Campbell.

Cottage Terrace, near East Cottage St. and Baker Park, Ward 20, 17 three-st'y frame dwells., each 22′ x 40′, pitch roofs; own. and bld., Aaron D. Gould.

Moreland St., near Blue Hill Ave., Ward 20, 2 three-st'y frame dwells., 48′ x 49′, 24′ x 49′, pitch roofs; own., Sarah Foley.

Granite Ave., near Adams St., Ward 24, frame dwell., 28′ x 30′; own., Minnie E. Clayton; b.d., M. McKinnser.

Rich St., near Selden St., Ward 24, two-st'y frame dwell., 24′ x 42′, pitch roof; own. and bld., T. J. Whynock.

Marcella St., No. 147, Ward 21, frame dwell., 27′ x 50′; own. and bld., H. K. Batchelder.

Conway St., near Fairview St., Ward 23, 2 frame dwells., 39′ x 30′, 30′ x 35′; own., A. B. Rand; bld., F. D. Rand.

Humboldt Ave., near Homestead St., Ward 21, two-and-one-half-st'y frame dwell., 40′ x 34′, hip roof; own., Katherine Haynes; bld., W. W. Colkin.

Walker St., No. 37, Ward 4, three-st'y frame dwell., 25′ x 51′ 4″, flat roof; own., Clara M. Wait; bld., C. C. Stone.

West Fourth St., No. 241, Ward 13, three-st'y frame dwell., 22′ 6″ x 51′, pitch roof; own., J. J. Hughes; bld., Howard Bros.

Cabot St., No. 83, three-st'y brick dwell., flat roof, 27′ x 52′; own., J. J. Namara; bld., James Fagin.

Norfolk St., nr. Ballou Ave., Ward 24, 3 three-st'y frame dwells., each 24′ x 51′ 6″; own. and bld., Carl S. Neilson, 1 Beacon St.

Ballou Ave., near Norfolk St., Ward 24, three-st'y frame dwell., flat roof, 24′ x 51′ 6″; own. and bld., Carl S. Neilson.

Kearsarge Ave., nr. Warren St., Ward 21, 2 three-st'y frame dwells., flat roof, 34′ x 34′ 6″; own., E. F. Galligan.

Southern Ave., nr. Darling St., Ward 24, two-st'y frame dwell., pitch roof, 26′ x 47′; own., Josephine B. Hidden; bld., W. H. Haddock.

Dorchester Ave., nr. Dix St., Ward 24, 2 three-st'y frame dwells., pitch roof, 20′ 4″ x 45′ and 34′ 10″ x 31′; own., Edwin T. Lewis, Jr.; bld., T. H. McDonald.

Rosedale Ave., nr. Washington St., Ward 24, three-st'y frame dwell., pitch roof, 30′ x 38′; own., Roxbury Real Estate Association; bld., John Breen.

Lansdown St., nr. Massachusetts Ave., Ward 20, 6 three-st'y brick dwells., flat roof, each 20′ x 40′; own. and bld., W. C. Norris.

Norton St., near Bowdoin St., Ward 24, 2 frame dwells., each 24′ x 47′; own., Annie Riley; bld., Wm. Riley.

Dalmatia St., cor. Dacia St., Ward 20, two-st'y frame dwell., flat roof, 23′ x 50′; own. and bld., John Seeley.

E. Sixth St., No. 701, Ward 14, frame dwell., 20′ 8″ x 48′; own., J. C. Hassebrock; bld., M. Hart.

Idaho St., near River St., Ward 24, frame dwell., 21′ x 28′; own., J. P. Ripley; bld., A. M. Crowell.

Northern Ave., nr. Washington St., Ward 24, frame dwell., 28′ x 46′; own., Lena A. Stubbs; bld., A. B. Fisher.

Phipps Ave., nr. Blue Hill Ave., Ward 24, 4 two-st'y frame dwells., pitch roof, each 29′ x 45′; own. and bld., D. & W. Jamieson.

Iona St., nr. Humphrey St., Ward 20, two-and-one-half-st'y frame dwell., pitch roof, 29′ x 48′; own., O. L. Stewart; bld., J. H. Holmes.

Jackson Pl., near School St., Ward 24, two-and-one-half-st'y frame dwells., hip roof, 29′ x 40′; own., and bld., Burgess & McPherson.

Bridgeport, Conn. — *Poplar St.*, frame dwell.; $3,300; own., Jas. A. Wilson.

Sedgwick St., frame dwell.; $3,000; own., Robert A. Knox.

Clinton Ave., frame dwell., 54′ x 54′; own., W. H. Seibs; arch., W. P. Banks; not let.

Brookline, Mass. — *Coolidge Corner*, two-and-one-half-st'y frame dwell., 30′ x 55′, gambrell roof; own., A. J. Hayman; bld., J. C. Gowan; arch., Loring & Phipps, Boston.

Coolidge Corner, two-and-one-half-st'y frame dwell., 20′ x 50′, gambrell roof; own., Dr. F. W. Draper; arch., Loring & Phipps, Boston; not let.

Brooklyn, N. Y. — *Sixth Ave.*, e s, 22′ 8″ n 1st St., 4 four-st'y brick dwells., 19′ 4″ x 62′, tin roofs; $19,200; own. and bld., M. S. Buckley, 287 Tenth St.; arch., Robt. Dixon, 219 Montague St.

Sixth Ave., n e cor. 1st St., four-st'y brick dwell., 22′ 8″ x 94′, tin roof; $8,000; own. and bld., M. S. Buckley, 287 Tenth St.; arch., Robt. Dixon, 219 Montague St.

Fort Hamilton Ave., n w cor. 85th St., two-st'y and attic frame dwell., 39′ 10″ x 31′, shingle roof; $6,000; own., M. Murphy, 84th St.; arch., J. J. Pettit, 186 Remsen St.

Fort Hamilton Ave., n e cor. 84th St., two-st'y and attic frame dwell., 39′ 10″ x 31′ 2″, shingle roof;

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is the strongest and most serviceable Cement made, and will permit the admixture of a larger amount of sand or gravel with less loss of strength than any other brand; it is therefore the most economical. It is the finest ground cement made, and has the largest bulk to the barrel.

The following test, made in actual work, by Col. D. C. Houston, Corps of Engineers, U. S. A., at the sea wall around Governor's Island, New York Harbor, has never been equalled by any other cement. It is as follows: Tensile strength per square inch, one day, 384 pounds; seven days, 600 pounds; thirty days, 818 pounds.

For Sidewalks it gives the best color, and the most endurable wearing surface. Most of the prominent Railroad Bridges and the large Office Buildings of the country stand upon a foundation of concrete made of ALSEN'S CEMENT.

Alsen's Portland Cement Works, New York Office, 143 Liberty Street.

BUILDING INTELLIGENCE.

(*Houses Continued.*)

$6,000; own., M. O'Donnell, 81st St. and 3d Ave.; arch., J. J. Pettit, 186 Remsen St.

Second Pl., w s, 125′ w Court St., 3 four-st'y brick dwells., 25′ x 72′, tin roofs; $30,000; own. and bld., Frank Mullowary, 189 Montague St.; arch., W. M. Coots, 189 Montague St.

Broadway, junction of Monroe and Howard Aves.; two-st'y brick dwell., 47′ 8″ x 41′, gravel roof; $3,000; own., Henry Weil, 202 Broadway; arch. and bld., J. J. Keirst, 599 Myrtle Ave.

Park Pl., n s, 106′ 11½″ w Washington Ave., four-st'y brick dwell., 30′ x 5? 8″, tin roof; $16,000; own., W. H. Reynolds, National Bank Building; arch., Dahlander & Hedman, Arbuckle Building.

De Kalb Ave., n s, 350′ w Lewis Ave., 4 three-st'y brick dwells., 25′ x 60′, gravel roofs; $28,000; own. and bld., E. Keinking, 41 Bristol St.; arch., L. Danaucher, 31 Watkins St.

Newkirk Ave., s s, 69′ w East 18th St., two-st'y and attic frame dwell., 28′ x 50′, shingle roof; $5,000; own., J. C. Jersey, 12 St. John's Pl.; arch., J. J. Pettit, 186 Remsen St.

Belmont Ave., n e cor. Fountain Ave., 6 two-st'y frame dwells., 16′ 8″ x 36′, tin roofs; total $9,000; own., and bld., M. F. Walsh, 2662 Eastern Parkway.

East Thirty-fourth St., e s, 135′ n Newkirk Ave., two-st'y frame dwell., 20′ x 46′ 6″, tin roof; $3,000; own., H. B. Robinson, 186 Buffalo Ave.; arch., A. W. Pierce, 1124 Flatbush Ave.

West Twelfth St., e s, 110′ s Avenue S, two-st'y and attic frame dwell., 26′ x 30′, shingle roof; $4,000; own., L. Freeman, 223 William St.; arch., J. J. Pettit, 186 Remsen St.

Arlington Ave., s s, 25′ w Linwood St., three-st'y frame dwell., 20′ x 45′, tin roof; $4,000; own., M. Heyser, 145 Tompkins Ave.; arch., Chas. J. Haviland, 101 Sheffield Ave.

Surf Ave., w s, 98′ n Beach 47th St., two-st'y and attic frame dwell., 68′ x 50′, shingle roof; $8,000; own., Robert Maxwell, 64 Worth St., New York; arch., E. Flaggand, 54 Bond St., New York; bld., C. F. Rogers, 70 Fifth Ave., New York.

Fifty-eighth St., n s, 300′ w 3d Ave., 4 three-st'y brick dwells., 25′ x 50′, tin roofs; total $16,000; own., E. Peterson, 318 Forty-eighth St.; arch., H. L. Spicer, 1269 Third Ave.

Cambridge, Mass.—*Highland Park*, Ward 2, frame dwell., 31′ x 40′; own., Wilbur S. Clarke; bld., E. N. Hutchinson.

Winsor St., Ward 2, frame dwell., 18½′ x 24′ x 39′; own., Mrs. E. Beck; arch., E. T. Harrington; bld., Edward J. Cogan.

Elm St., Nos. 143-149, nr. Cambridge St., Ward 2, 4 brick and frame dwells., 74′ x 46′; arch., J. E. Close; own. and bld., Joseph Green.

Irving St., Ward 1, frame dwell., 26′ x 36′ 6″; own., L. D. Garfield; arch., A. D. Wright; bld., Calvin Wright.

Camden Pl., No. 7, Ward 1, frame dwell.; own., Joseph Ray; bld., Mr. Collins.

Cowperthwaite St., Ward 1, frame dwell., 24′ x 44′; own., Michael Sullivan; bld., John C. McGirr.

Putnam Ave., Nos. 155-157, Ward 1, frame dwell., 45′ x 41′ 6″; own., Edward Murphy; arch., G. Fogerty; bld., J. H. Keenan & Co.

Cambridge St., cor. Irving St., Ward 1, frame dwell., 16′ x 23′, own., Mrs. Emma F. Arnold; bld., N. W. Freeman.

Chelsea, Mass.—*Webster Ave.*, 2 two-and-one-half-st'y frame dwells., 24′ x 50′, pitch roof; own., John Buck; arch., D. H. Woodbury, Boston.

Chicago, Ill.—Jos. Cormack, 2 two-st'y brick dwells., 440-442 Forty-fourth St; $12,000.

H. Henderson, three-st'y brick dwell., 182-184 51st St.; $16,000.

M. O. Tremain, 2 two-st'y brick dwells., 4815-4817 Forrestville Ave.; $6,000.

M. Updike, two-st'y frame dwells., 12036 Stewart Ave.; $3,00 .

Jones & Foley, 4 two-st'y brick dwells., 132-144 Seventy-third Pl.; $7,000.

E. G. Minnick, 5 two-st'y brick dwells., 147-155 Seventy-fifth Pl.; $10,000.

H. McCormick, 3 one-st'y frame cottages, 5639-45 South Carpenter St.; $3,000.

C. C. Churchill, 2 one-st'y brick dwells., 211-213 Wilson Ave.; $5,000.

Chas. E. Innes, 3 three-st'y brick dwells., 6056-58 Kimbark Ave.; $5,000.

John F. C. Theiss, 3 three-st'y brick dwells., 1800-1804 Arlington St.; $12,000.

H. H. Horn, two-st'y frame dwell., 7205 Jeffery Ave.; $3,000.

Adolph Frickler, three-st'y brick dwell., 2611 N. Paulina St.; $5,000.

Mrs. Slayton, three-st'y brick dwell., 5628 Michigan Ave.; $10,000.

Chas. E. Hewitt, two-st'y brick dwell., 5830 Woodlawn Ave.; $6,000.

L. Zick, two-st'y brick dwell., 865 Sawyer Ave.; $3,000.

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AMERICAN ARCHITECT AND BUILDING NEWS CO., Boston, Mass.

BUILDING INTELLIGENCE.

(*Houses Continued.*)

B. H. Becketts, two-st'y frame dwell. and one-st'y barn, 5835 Kimbark Ave.; $7,000.

S. Wedeles, 3 two-st'y brick dwells., 444-448 Forty-fourth St.; $18,000.

Wm. Turnbull, 3 two-st'y brick dwells., 6134-6138 Oglesby Ave.; $12,000.

Wm. Keck, two-st'y brick flats, 6619 So. Carpenter St.; $3,500.

Alexander Scott, two-st'y brick dwell., 2130 West Monroe St.; $5,000.

C. A. Hanson, two-st'y frame dwell., 226 Wilson Ave.; $3,000.

Greenwich, Conn.—Three-st'y stone dwell., pitch roof; $35,000; own., N. B. Mead; arch., Thorp & Knowles, 21 West 24th St., New York City; contract let.

Newark, N. J.—*Sherman Ave., Nos.* 183-185, 3 two-st'y and extension frame dwells., 50′ x 28′, tin roofs; about $5,000; own., J. Rorche; arch., W. Earle Cass, 800 Broad St.

Vanderpool St., Nos. 56-60, 3 two-st'y and extension frame dwells., 50′ x 28′, tin roofs; $8,000; also three-st'y frame apart., 24′ x 59′; $8,000; own., L. Ellean; arch., W. Earle Cass, 800 Broad St.

Ridge St., Forrest Hill, two-st'y and attic frame dwell.; about $6,000; own. and arch., H. Galloway Ten Eyck, 784 Broad St.

Broad St., Mt. Pleasant and Orient Aves., 21 three-st'y brick dwells., tin roofs; own., J. B. Flint, 78 Maiden Lane, New York City; arch., M. N. Cutter, 203 Broadway, New York City.

New Castle, Pa.—*Croton Ave.*, two st'y frame dwell.; own., D. W. Miller; arch., C. C. Thayer.

New York, N. Y.—*One Hundred and Thirty-fourth St.*, s s, 300′ East Trinity Ave., 4 three-st'y brick and frame dwells., 18′ 9″ x 60′, 34′ high, flat tin roofs; $24,000; own., Peter Goetz, 231 East 48th St.; arch., Edward Wenz, 1491 Third Ave.

One Hundred and Thirty-second St., n s 175′ East St. Ann's Ave., five-st'y brick dwell., 25′ x 55′, 60′ high, flat tin roof; $20,000; own., John J. Terrents, 1529 Avenue A; arch., Herman Horenberger, n e cor. 158th St. and Melrose Ave.

Union Ave., e s, 100′ North 163d St., three-st'y brick and frame dwell., 18′ x 53′, 35′ high, flat tin roof; $4,000; own., Mary Wehner, 960 Union Ave.; arch., Louis Folk, 1013 Boston Ave.

Washington Ave., e s, 51′ n 180th St., 3 three-st'y stone and frame dwells., 17′ x 45′, 32′ high, flat tin roofs; $7,000; own., Frank E. Cabus, 225 West 126th St.; arch., Chas. S. Clark, 719 East 177th St.

Boston Ave., e s, 175′ South Woodruff St., 2 three-st'y brick and frame dwells., 16′ 5″ x 56′ x 60′, 35′ high, flat tin roofs; $3,000; own., Henry Humber, Penfold Ave. and Crotona Park; arch., J. J. Vreeland, 709 Tremont Ave.

BUILDING INTELLIGENCE.

(*Houses Continued.*)

Philadelphia, Pa.—*Moore St.*, e Emerald St., 2 two-st'y brick dwells., 15′ x 66′; con., Fred B. Franks.

Palmetto St., s Levick St., two-st'y brick dwell., 16′ x 40′; own., F. J. Schlett.

STABLES.

Boston, Mass.—*Oakdale St.*, near Green St., Ward 23, two-st'y brick stable, 51′ 6″ x 40′, flat roof; own., E. H. William; bld., W. S. Sumner.

Newfield St., near Weld St., Ward 23, one-st'y frame stable, 30′ x 40′, pitch roof; own., T. F. Cunningham; bld., Rolfe & Duban.

Porter St., near Boylston Ave., Ward 23, three-st'y brick stable, 34′ 6″ x 62′, flat roof; own. and bld., J. J. Muhan.

Philadelphia, Pa.—*Randolph St.*, s Jefferson St., two-st'y brick stable, 27′ x 104′; con., Geo. Kessler.

North Eighth St., No. 2530, two-st'y brick stable, 14′ x 42′; con., D. C. Schuyler.

Carlisle St., cor. Norris St., three-st'y brick stable, 25′ x 45′; own. and bld., John Stafford, 1606 Susquehanna Ave.

TENEMENT-HOUSES.

Cambridge, Mass.—*Montgomery St., No.* 27, Ward 5, frame tenement-house, 33′ 8″ x 38′ 8″, own., arch. and bld., Peter Perrault.

Montgomery St., No 27A, Ward 5, frame tenement, 30′ 8″ x 34′; own., arch. and bld., Peter Perrault.

New Haven, Conn.—*Spruce St.*, four-st'y brick block for 16 tenements, 40′ x 75′; own., Bernard Levi; arch., Brown & Berger; contract not let.

Waterbury, Conn.—*West Main St.*, cor. Willow St., four-st'y brick block for 5 stores on ground-floor and 12 flats above, 111′ x 65′, tin roof; own., F. H. Humphrey; arch., Jos. A. Jackson; bld., Tracy Bros. Co.

WAREHOUSES.

Chicago, Ill.—Donohue & Henneberry, eight-st'y brick warehouse, 146-148 Plymouth Pl.; $25,000.

F. Holbrook, two-st'y brick warehouse, 72-74 E. Ohio St.; $10,000.

Estate, L. C. P. Freer, eight-st'y warehouse, 231-237 Washington St.; $180,000.

MISCELLANEOUS.

Chicago, Ill.—Universal Gas Co., 5 two-st'y brick gas-houses, 3000-3120 Pitney Ct.; $40,000.

Universal Gas Co., 3 one-st'y brick gas-houses, 3000-3120 Pitney Ct.; $50,000.

Heywood & Morrill, brick smokestack, 1251-1301 Taylor St.; $3,000.

Herman Kirchhoff, one-st'y brick boiler-house, 156-158 Wilmot St.; $5,000.

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THE AMERICAN ARCHITECT AND BUILDING NEWS

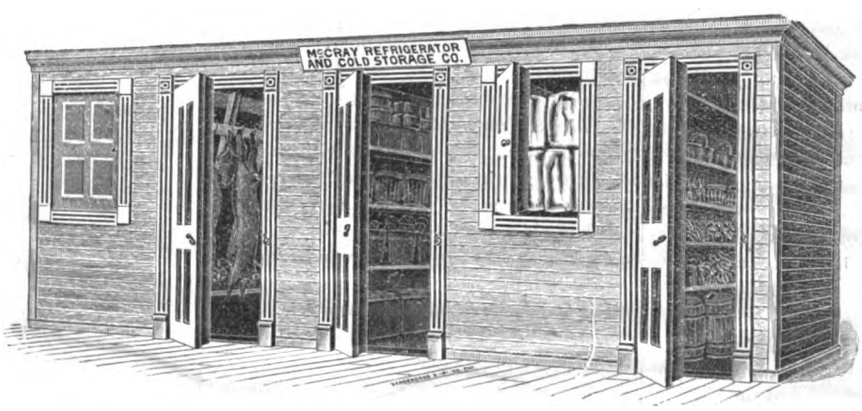
ADVERTISERS' TRADE SUPPLEMENT.

No. 158. SATURDAY, AUGUST 3, 1895 VOLUME XLIX. No. 1053.

THE McCRAY SYSTEM OF REFRIGERATION.

THE system of refrigeration which we illustrate on this page has the merits of being very convenient, as well as a saver of ice, and is excellently adapted for private residences. This system is used in all refrigerators and cold storages built by the McCray Refrigerator & Cold Storage Co., of Kendallville, Ind. The quality of material, workmanship, insulation and system are the characteristics which go to make up a refrigerator. The material used in the construction of the McCray refrigerators is of the very best selected stock; the work is done by first-class mechanics, and all goods are finished very neatly.

The refrigerators for residences are carefully made of two thicknesses of well-seasoned lumber and two thicknesses of good paper. The walls are filled with 1¼ inches of mineral-wool, which is proved by experiment to be the best non-conductor of heat and cold. The inside of the refrigerators is lined with the best Tennessee poplar, except the very high-priced goods, which are lined with beautiful tiling. The outside is finished in ash, oak, or Georgia pine, or any other wood that may be desired by the purchaser, special efforts being made to suit the fancy of the customer.



This system insures a perfectly dry, cold, and purely fresh air inside the refrigerator, and is the same system that is used by this company in the construction of large refrigerators and cold-storage houses for hotels and public institutions, which is claimed to be a great success.

The Company's modern residence refrigerator can be placed in a pantry and iced from the outside. This design of a modern residence refrigerator saves the inconvenience of the ice being carried through the room to the refrigerator, and the water dripping all over the floor, as in the old-style refrigerator.

This Company manufactures any size desired, and will finish the front of the refrigerator to correspond with the finish in the pantry where it is to go.

The cut shows an 8 by 20 three-department hotel refrigerator which was constructed for and placed in the Hotel Windermere, Jackson Park, corner Cornell Avenue and Fifty-sixth Street, Chicago, Ill. This cooling room was one of six large coolers constructed for this hotel at the same time. At that time Henry Weaver was manager of the hotel, but since then has been chosen as manager for the new Planters' Hotel, at St. Louis, which was recently completed, and the fact that he awarded the contract for all the refrigerator work to the McCray Refrigerator & Cold Storage Co. for this hotel, which is the largest of its kind in the West, shows the high esteem in which the system is held by those who have used it.

McCRAY REFRIGERATOR AND COLD-STORAGE CO.,
KENDALLVILLE, IND.

YALE LOCKS, ETC.

THERE is no better instance of the entire revolution in every-day practicalities than that furnished by the development of that absolute necessity, security from intrusion, in the invention of the Yale Lock by Linus Yale, Jr, and its subsequent extension and application to all the known uses of a lock by Henry R. Towne, who was until Mr. Yale's death his associate in business for a brief period, and who afterwards became the successful organizer of the greatest lock manufacturing concern, quantity and quality both considered, in the world.

Mr. Yale had the inventive genius, as shown by the application of two entirely new principles to the ordinary door lock, and Mr. Towne had the complementary genius, so often wanting in the development of inventions, of skill in the designing of mechanical methods and details; insight into the demands of the people which made possible the application of the Yale Lock to every practical use; and the progressive idea so to improve and apply the invention that it has become not only the standard in itself, but the model for all American makers of locks.

Linus Yale, Jr., who had been in business with his father, Linus Yale, Sr., at Newport, Herkimer Co., New York, manufacturing bank locks, in which field he possessed extraordinary ability and won a leading place, conceived the idea that the key mechanism of a door-lock could be separated from the bolt mechanism, thus enabling him to use a uniform size of key, regardless of the thickness of the door. He was the first to separate the key mechanism of a lock from the case containing the bolting mechanism, and to enclose the former in a separate "cylinder," or key escutcheon. This fundamental invention has since passed into universal acceptance for all fine locks, and has revolutionized the lock industry of the United States. Having accomplished this, Mr. Yale further improved his lock by adapting it to receive a key of thin flat metal. He did this by providing a small cylindrical plug, containing a slot to receive the key and forming the axis or bearing in which the key revolved to operate the bolt. These two inventions were equally fundamental — the first in its effect upon lock construction, and the second, in its substitution of a flat key for the cylindrical keys previously in universal use.

The key-plug of the Yale Lock contains a series, usually five or more, of pin tumblers, each contained in a hole or recess, and each having above it a secondary pin or "driver," which prevents the rotation of the plug by intersecting the joint between it and the surrounding tumbler case or escutcheon. The insertion of the proper key raises the tumblers, so that the joints between them and the drivers coincide exactly with the joint between the key-plug and the surrounding escutcheon. A variation of one-fiftieth of an inch in any tumbler, or in the fitting of the key beneath it, destroys the adjustment and prevents the operation of the lock. This fact accounts for the unrivalled capacity of the Yale lock for permutations or key changes, and enables its makers to produce 50,000 or more locks without duplicating a single key, whereas the key changes of common locks are usually limited to less than 100 permutations, and more frequently to only 24, or even

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"CHARLES I DEMANDING THE FIVE IMPEACHED MEMBERS."

From the painting by

JOHN SINGLETON COPLEY, R.A.,

in the Boston Public Library.

A few copies of the excellent heliotype made of this fine historical picture, 11 x 16 inches, printed on heavy plate paper, 22 x 28 inches, with key to the portraits, are for sale.

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12 changes. Mr. Yale had adapted his inventions to only eight different types of locks, and (in curious contrast to the high mechanical quality of his work relating to bank locks), had made these adaptations in crude and somewhat unmechanical forms, when he met Henry R. Towne, then of Philadelphia, who, perceiving the possibility of creating a large industry out of Mr. Yale's inventions, proposed that they should unite their interests. As a result, the two formed a partnership in October, 1868, under the name of "The Yale Lock Manufacturing Company" and bought land in Stamford for the erection of a plant. Mr. Yale continued his business in Shelburne Falls, while Mr. Towne undertook the designing and erection of new buildings in Stamford. In December, 1868, Mr. Yale died suddenly in New York City of heart disease, before the new plant at Stamford had been erected. Undaunted by this catastrophe, Mr. Towne, however, pushed the enterprise forward, assisted for a short time by John B. Yale, a son of the inventor, and in March, 1869, the new buildings were completed, the machinery and business removed from Shelburne Falls to Stamford, and business begun at the new location with about thirty employés. In June of that year Mr. Towne was chosen president, which position he has held continuously since, and in 1870 the entire Yale interest was disposed of and he became ultimately the sole owner.

Mr. Towne had seen his partner but a few times in the course of the two short months of their business connection, and the story of the development of the enterprise from a small workshop employing less than thirty men, endeavoring to introduce a new and special product upon the market, to the great industry of to-day, employing over 1,400 persons and leading the trade of the world in its line, which has revolutionized previous practice and set the standard for all American lock-makers, is largely the story of Mr. Towne's personal endeavor and influence, as a thoroughly-trained mechanical engineer, guided by an abiding conviction that, in lock-making as well as in larger engineering work, high-class workmanship and design unhampered by traditional usage would in due time command the public approval and a large market.

In other important matters the Company, under Mr. Towne's leadership, has forced itself to the head. In no one matter is this so noticeable as the influence the Company has had upon the art metal-work of the country, as distinct from the merely ornamental hardware, the product of cheap processes. Mr. Towne early saw the possibilities in this sort of endeavor and in 1875, before American schools of art had developed students and artists who were capable of illustrating, to use the word, ideas in this branch of endeavor, artists from Germany and France were employed and the first serious effort to produce really artistic hardware for interior finish was made by the Yale & Towne Manufacturing Company. This branch of its business has developed in almost unexpected lines. It has created a demand for special work in brass, bronze, copper, iron and other metallic finishes and is now one of the great departments of the plant. It is not too much to say that in this particular field the product leads the world. European work, while it is often of excellent design, is not characterized by that excellence of finish aimed at and reached by the Yale & Towne Company. Its art department has created a new standard, and leads the trade.

A wholly new art now being introduced by the Yale & Towne Manufacturing Company, although allied in some sense with its other high-art productions is "Stylo-Chiselry," or incising upon metal. In the department devoted to this new development are several artists, some of them young women, tracing the delicate patterns which are to be applied to the metals. Here may be seen some of the ornamental steelwork for safe-doors, and in addition, art productions for the decoration of the home, the sanctuary, the Sunday-school room and even work for the adornment of monuments. Bronze tablets with Scriptural mottoes, beautifully set in appropriate borders and lettered with the best of taste, are a part of the work done here. There is the most beautiful lace-like tracery for register fronts, making that article, so often stiff and always homely, something handsome to look upon. In monumental work a metal figure or design may be set in marble, with beautiful effect, giving life to the coldness of the marble or granite. Some of the effects produced in this department are second in this line of decoration to none in the world. It is a new departure in art and bids fair to be a most popular one. The tablet in bronze of "Jean d' Arc" may be remembered by some readers. It is from this department of the great Stamford plant.

Within the past two years the entire manufacturing plant of the Branford Lock Works, whose large line of products is widely known, has been acquired by the Yale & Towne Manufacturing Company by purchase, and in the extensive shops at Branford the complement of builders' hardware, in the line of standard goods for the market, is manufactured. The two establishments form a combination which covers the widest range of builders' hardware and enables the Company to meet all requirements of the market for goods of the highest class of production, artistically, and for thoroughly well-made and acceptable goods of a cheaper, but not less useful grade. The two establishments furnish employment for more than 1,500 persons, the majority of them being men, many of them being mechanics of high skill, and not a few of artistic excellence.

It is interesting, even though the various operations have already been hinted at in this article, briefly to sketch them in order to show how varied they are. The making and machining of heavy and light castings, the making and working of light metal-work for locks and hardware in brass, iron and bronze by repetition processes in great variety and largely by automatic machinery; the fine and delicate work relating to chronometer movements for time-locks; all the processes of the founder's art; electro-plating in many metals, dipping, coloring, oxidizing, and other treatments for producing surface-finish and ornament, chain-making, etc.

The buildings of the Company occupy a large, quadrilateral space, in an eligible location in Stamford of about twenty-one acres, and are arranged in convenient position to carry on the business as an harmonious whole. The Company was organized in 1868, its corporate name then being the "Yale Lock Manufacturing Company." For almost the entire first ten years of its existence Mr. Towne was sole owner. It became desirable, however, to enlarge its capital, and in 1881 the capital stock was increased and offered for public subscription. It was all soon taken and the paid-up capital was for some time $500,000. It has since been increased to $1,000,000, although the amount invested at the present time is very much larger. — *Hartford Courant.*

DIXON'S GRAPHITE PIPE-JOINT COMPOUND.

Twelve or fifteen years ago this article was known under the name of "Smear Grease," and later was changed to "Pipe-Joint Grease." It really is not a grease, and as the name has caused some misunderstanding, the Dixon Company have decided to change it, and it hereafter will be known as "Dixon's Graphite Pipe-joint Compound." This Compound, under one or the other of its several names, has been in the market for about twenty years. It is not only useful for joints, and all steam, gas and water piping, but is equally useful for smearing gaskets and flange-joints of meters, traps, and for bolts, screws, etc. In the mills, mines and factories of the Dixon Company, this Compound has been used in preference to any other article. It is infinitely superior both in usefulness and economy to red lead, and the Dixon Company recommend it as such with the fullest degree of certainty. That the Company is not prejudiced in its favor is easily shown by the testimonials of its customers, among whom are manufacturers of steam and hot-air radiators and heating appliances, iron companies, machinists, engineers

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LOCALITY OF AUTHORSHIP OF DESIGNS
PUBLISHED IN THE AMERICAN ARCHITECT.

The assertion that the *American Architect* is a paper whose characteristics are *national* and not merely local is supported by the following table, which exhibits the manner in which several journals have treated domestic architecture In this comparison the IMPERIAL edition of the *American Architect* is considered, since the additional plates of the INTERNATIONAL edition are, in the main, illustrations of foreign work.

PAPER.	Number of subjects contributed.	Number of contributing architects.	Towns in which contributors were established.	States in which contributors were established.
No. I. . . .	214	109	28	16
No. II. . .	137	78	21	15
No. III. . .	118	56	16	11
Am. Architect.	267	152	47	24

In the first column, "subjects," only actual domestic work is included (foreign work, imaginative designs and the work of sketch-clubs are excluded), and the figures there given indicate that this number of designs might have been prepared by the same number of architects practising in the same number of different towns. The remaining columns show how nearly this ideal distribution has been reached in each case.

Architects practising in the State of publication furnished.				
Subjects.	Per cent of total number of subjects.	Different architects contributing.	Per cent of total number contributing architects.	Towns.
161	.752	75	.688	7
46	.335	24	.307	2
70	.593	22	.392	1
73	.273	39	.256	3

From this table it appears that Massachusetts architects —.256 per cent of the total number of contributors— provided only .273 per cent of the total number of designs published, percentages which, in view of the fact that Massachusetts is one of the most populous States in the Union, prove that they have not been accorded an unreasonable amount of our limited space.

and contractors, railroad companies, gas companies and general manufacturers.

The President of the Water and Lighting Department of Harrisburg, Pa., said: "I have long ago forbidden the use of white or red lead or anything but your Graphite Compound in this department. The result is that we have no more breaking of bolts or nuts in our street mains, valves, etc., or any trouble of that kind in or about our pumping-plant. I think those plumbers or steam-fitters who persist in the use of white or red lead are doing so purely through ignorance, as nothing is so costly, not even carelessness."

The use of red lead depends largely upon tradition. Our forefathers had nothing better and knew of nothing better, but that is no reason why we should continue to use it while there is something so many times better and more economical.

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SOMETHING NEW.

THE Shull's Overhead Mullion Pulley, just being introduced by the manufacturers, F. W. Stevens & Co., 146 Franklin Street, Boston, Mass.

Please note the following facts about this Pulley: it possesses *all* the advantages of their Shull's Overhead Axle Pulley while they use but one weight, and do away with the mullion pocket room entirely, which is a great advantage and saving of room and ought to be appreciated by architects and builders.

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BUILDING INTELLIGENCE.

Reported for the American Architect & Building News.

ALTERATIONS AND ADDITIONS.

Brooklyn, N. Y. — *Nassau St.*, s s, 25′ w Adams St., three-st'y brick stable, 76′ x 75′, three-st'y brick extension, 45′ x 70′, to be added, and internal alterations made; $15,000; own., N. Y. Transfer Co., 52 Nassau St.; arch., A. De Saldern, 44 Broad St., N. Y.

West Eighth St., e s, 350′ n Surf Ave., two-st'y frame fire-engine house, 25′ x 61′, one-st'y frame extension, 25′ x 30′, to be added, internal alterations and general repairs to be made; $3,000; own., City of Brooklyn; arch., H. D. Whipple, West 15th St., Coney Island; bld., Jas. McKane, Sheepshead Bay, L. I.

Washington St., e s, 158′ 6″ s Concord St., three-st'y brick stable, 52′ 6″ x 115′ 5″, damage by fire to be repaired; $3,000; own., A. M. Stein & Co., 229 Washington St.; bld., G. Erda & Co., 108 Kent Ave.

Adelphi St., No. 363, three-st'y and basement brick dwell., 20′ x 40′, one-st'y and basement brick extension to be added, and internal alterations made; $3,000; own., R. D. Benedict, 363 Adelphi St.; arch., Benson & Brockway, 55 Broadway; bld., W. S. Wright & Son, Fulton and Carlton Aves.

Bolivar St., s s, 120′ w Canton St., four-st'y brick stable, 50′ x 105′; four-st'y and basement brick extension: 27′ 8″ x 115′, to be added, and other alterations made; $13,000; own., Abraham & Straus, Fulton St.; arch., G. L. Morse, Eagle Building; bld., R. Rutan, 957 Putnam Ave.

BUILDING INTELLIGENCE.

(*Alterations and Additions Continued.*)

Irving St., cor. of Sedgwick and Van Brunt Sts., five-st'y brick warehouse, 50′ x 310′, internal alterations to be made; $7,000; own. and arch., Brooklyn Wharf and Warehouse Co., 68 Broad St., New York; bld., F. J. Ashfield, 168 Montague St.

East Twenty-third St., w s, 600′ n Emmons Ave., two-st'y frame fire-engine house, 27′ 6″ x 60′; one-st'y frame extension to be added, internal and other alterations made; $3,000; own., Sheepshead Bay Fire Dept.; arch., H. D. Whipple, West 15th St. and Surf Ave.; bld., O. G. Ammack, East 23d St. and Voorhis Ave.

Van Buren St., Nos. 315-317, four-st'y brick factory, 40′ x 200′, internal alterations to be made; $3,000; own., Narwood Bros., 226 North 9th St.; bld., F. G. and G. Van Riper, 16 Bedford Ave.

HOUSES.

Baltimore, Md. — Three-st'y frame dwell., s w cor. 10th and Baker Sts.; own., Paul Funk.

Two three-st'y brick dwells., e s Gilmor St., n Patterson Ave.; own., Wm. Sein, 934 Harlem Ave.

Three two-st'y brick dwells., e s Cannon St., beg. s e cor. Townsend St.; own., Worick & Parish.

Three-st'y brick dwell., s s Pratt St., bet. Eden and Spring Sts.; own., M. Kolker, 70 Centre Market Space.

Brooklyn, N. Y. — *Stanhope St.*, n s, 125′ e Irving Ave., three-st'y frame dwell., 25′ x 63′, tin roof; $4,500; own., E. Hester, 183 Central Ave.; arch., D. Acker & Son, 752 Broadway.

Fifty-seventh St., n s, 347′ 6″ w 2d Ave., 6 two-st'y

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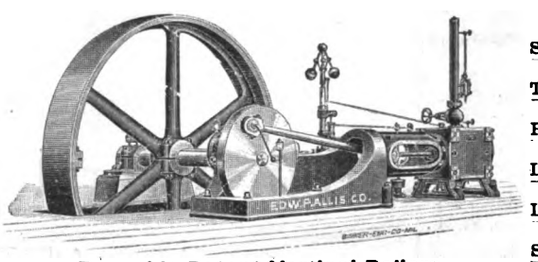
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BUILDING INTELLIGENCE.

(*Houses Continued.*)

brick dwells., 19′ x 45′, tin roofs; $9,000; own., Jos. Preston & Co., 60th St., bet. 12th and 13th Sts.; arch., A. Cehlo, 349 Nineteenth St.

Seventh St., s s, 147′ w 6th Ave., four-st'y brick dwell., 30′ x 61′, tin roof; $11,000; own., Wm. Brown, 7th St., near 6th Ave.; arch., Robt. Dixon, 219 Montague St.

Church Ave., n s, 50′ e West 21st St., two-st'y frame dwell., 25′ x 36′ 6″, shingle roof; $4,000; own., A. M. Williamson, Church Ave.; arch., J. S. Richardson, Flatbush; bld., A. W. Simpson, 82 East Broadway.

Fifty-seventh St., n s, 100′ e 1st Ave., 7 three st'y brick dwells., 19′ x 45′, tin roofs; $24,500; own., G. W. Morton, 568 Throop Ave.; arch., Willard Parker, 371 Fulton St.

East Twenty-ninth St., e s, 290′ n Ave. D, two-st'y frame dwell., 23′ x 30′, shingle roof; $3,000; own., J. & A. Gow, 169 Cleveland St.; arch. and bld., A. Brower, Union Course.

Linwood St., e s, 25′ s Belmont Ave., 4 two-st'y frame dwells., 18′ 9″ x 47′, tin roofs; $8,000; own., M. Kelly, Atlantic and Van Siclen Aves.; arch., Chas. Infanger, Atlantic and Georgia Aves.; bld., W. E. Sauer, Magenta and Crescent Sts.

Franklin St., e s, 75′ w Huron St., three-st'y frame dwell., 28′ x 64′, tin roof; own., Augusta Dreyer, 202 Franklin St.; arch., H. E. Fink, Glendale; bld., R. Bauer, 208 Palmetto St.

Eighth Ave., n e cor. Union St., 2 four-st'y and basement brick dwells., 23′ x 56′, tin roofs; total cost $26,000; own., arch. and bld., Wm. Flanagan, 69 Seventh Ave.

Prospect Pl., n s, 120′ e Vanderbilt Ave., 3 four-st'y brick dwells., 20′ x 60′, tin roofs; total cost, $20,400; own., arch. and bld., Delany & Collins, 936 Pacific St.

Belmont Ave., s s, 25′ e Stone Ave., three-st'y brick dwell., 25′ x 73′, tin roof; $7,500; own., H. Goldberg, Christopher and Belmont Sts.; arch., L. Danancher, 31 Watkins St.; bld., L. Wolf, Christopher and Belmont Sts.

Stone Ave., s e cor. Belmont St., three-st'y brick dwell., 25′ x 75′, tin roof; $7,500; own., H. Goldberg, Christopher and Belmont Sts.; arch., L. Danancher, 31 Watkins St.; bld., L. Wolf, Christopher and Belmont Sts.

Union St., s s, 135′ e Hicks St., four-st'y brick dwell., 20′ 6″ x 60′, tin roof; $4,000; own. and bld., Thos. McCann, Bedford and Douglas Sts.; arch., J. G. Conneal, Jefferson Building.

Ave. S, n e cor. West 13th Ave., two-st'y and attic frame dwell., 25′ 34′ 6″, shingle roof; $3,400; own., Chas. Abresch, 17 Broadway, N. Y.; arch., L. Oberlin, 15 Whitehall St., N. Y.

McDonough St., n s, 275′ e Stuyvesent Ave., 4 two-st'y and basement brick dwells., 19′ 5″ x 45′, tin roofs; $18,000; own., A. J. De Revere, 557A Halsey St.; arch. and bld., J. J. De Revere, 557A Halsey St.

Park Place, n s, 26′ e Nostrand Ave., 6 three-st'y and basement brick dwells., 19′ x 46′, iron roofs; $48,000; own., John Fraser, 45 Rochester Ave.; arch., H. R. Brewster, 666 Macon St.

Bainbridge St., n s, 74′ 8″ e Patchen Ave., 3 four-st'y brick dwells., 25′ x 60′, tin and gravel roofs; $22,500; own., P. Donlon, 831 Dean St.; arch., J. E. Styles, 210 St. Mark's Ave.

Meserole Ave., n e cor. Bushwick Ave., three-st'y brick dwell., 25′ x 60′, tin roof; $9,000; own., Abbott Katz Brewing Co., Meserole Ave. and Scholes St.; arch., Chas. Newmayer, 1169 Myrtle Ave.

East Nineteenth St., e s, 330′ n Ave. B, two-st'y and attic frame dwell., 25′ x 32′, shingle roof; $4,500; own., A. B. Boyd, 2 Nassau St., New York City; arch., J. J. Pettit, 186 Remsen St.

Arlington Pl., n e cor. Macon St., three-st'y and basement brick dwell., 20′ x 60′, tin roof; $6,000; own., Mrs. E. H. Davis, 2040 Fulton St.; arch., B. Finkenseiper, 93 Broadway; bld., S. Stenbrecher, 297 McDougal St.

Fourth Ave., w s, 24′ s 49th St., 4 four-st'y brick dwells., 19′ x 55′, tin roofs; $24,000; own. and bld., Casey & Flanagan, 109 West 30th St., N. Y.; arch., W. M. Coots, 186 Remsen St.

Forty-ninth St., s w cor. 4th Ave., four-st'y brick dwell., 24′ x 80′, tin roof; $12,500; own. and bld., Casey & Flanagan, 109 W. 30th St., N. Y.; arch., W. M. Coots, 186 Remsen St.

Arlington Ave., s s, 30′ e Warwick St., three-st'y brick dwell., 28′ x 75′, tin roof; $9,000; own., Jos. Forbes, Arlington Ave., near Cleveland St.; arch., R. T. Short, 2975 Fulton St.; bld., Henry Roth, Broadway, near Reid Ave.

TENEMENT-HOUSES.

Cambridge, Mass.—*Fifth St., No.* 81, frame tenement, 23′ 6″ x 48′ 6″; own., Charles Rotenberg; bld., John A. McIsaacs.

Cherry St., No. 32, frame tenement, 27′ 2″ x 43′ 2″; own., Mrs. S. M. Stinman; bld., Patterson & Fox.

Chestnut St., No. 57, 2 frame tenements, 31′ x 38′; own., Horace P. Howlett; bld., W. P. Balser.

Cambridge St., No. 716, 3 frame tenements, 22′ 6″ x 46′; own., Henry Green.

Western Ave., No. 96, frame tenement, 25′ x 51′ 6″; own., Bernard McCaffrey; bld., John C. McGirr.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 159. SATURDAY, SEPTEMBER 7, 1895. Volume XLIX. No. 1028.

PASSENGER ELEVATORS.

The importance of greater intelligence and care being used in the plan and construction of the elevator plants required for the equipment of the modern building is certainly coming to be more appreciated. The securing of the services of a prominent architect by a well-known manufacturer of elevators for consultation regarding hatchway construction is a tangible proof of the foregoing statement.

Notwithstanding the fact that America leads the world in the manufacture of this class of building equipment, it is to the discredit of many that so many elevator plants have been constructed during the past few years which are so radically defective in important respects. The reason for this was apparently that purchasers generally failed to appreciate the existing defects, and those manufacturers who were competent to judge did not care to go to the additional expense necessitated by the improvements which were required. Once pointed out, however, the desired result was sure to follow. It was but a few months since that the Winslow Bros. Elevator Company published a series of articles calling the attention of architects to some of the mistakes of elevator manufacturers, which proved sufficient to effect an improvement in at least some important respects. It is true to-day — as it was not one year ago — that the radical superiority of the vertical cylinder elevator over the horizontal is generally recognized, not only by the architect, but even by those manufacturers who have for years placed themselves before the public as ardent advocates of the inferior type.

Safety devices have been devised during the past year by several elevator manufacturers more in accordance with what commonsense dictates to be necessary, that is, to prevent the accidents which actually occur, instead of the theoretically but practically impossible.

Manufacturers and owners have come to appreciate by a statement of facts more of the utility of using some form of high duty pumping-engine for large elevator plants, instead of the crude mechanism heretofore adopted by all elevator builders.

There is in the possession of the Winslow Bros. Elevator Co., much practical information, the result of some years of experience in connection with the well-known Hale Elevator Co. of the past, which is available for the use of any architects who may be interested in the general subject. This information will be of value to those who may be undecided in connection with the consideration of the requirements of any building as to how many and what type of elevators are best adapted to serve the required duty. The data referred to will also materially assist in deciding in the light of the best experience, what speed, lifting-capacity, size of cars, number and type of pumps shall be the best adapted to accomplish the desired results. Competent engineers are also prepared at all times to advise intelligently regarding the location and best arrangement of elevator machinery. The benefit of the advice of the Winslow Bros. Elevator Co.'s experts is proffered to architects with the belief that it will be of value, in some instances at least, because it is the result of years of familiarity with the best elevator construction known, and because the theory is backed by the practice of what theoretically should be done. Their services are offered with a guarantee of a fairness which shall compel advice and statements regarding any particular type of elevator which may be under consideration, based upon honest belief.

The electric elevator in its present state of development has a place and can fill certain duty under the right conditions more satisfactorily than can any other type of elevator. The trouble is, however, at the present time, that this machine is not treated fairly, either by its advocates or opponents. Claims made in its behalf are absurd to those who appreciate its necessary limitations. On the other hand, equally groundless are the claims of those manufacturers who, for selfish or other reasons, loudly proclaim that the electric elevator is a fake. The high-pressure hydraulic elevator may be safely used under certain conditions, notwithstanding the somewhat disastrous experience of the not remote past. It is, however, unwise, on account of the undoubted advantages that the system possesses under the right conditions, to advocate its use for service where it would prove unsatisfactory and dangerous. In fact, there is a place where every known type of elevator fits to the best possible advantage. There is, to the contrary, no right place in any building for elevator construction which is not built upon honor, but into which cheap material and unskilled labor have entered as necessary elements in the production of the low priced, which is so often at least synonymous with the cheap and unreliable.

There has been no greater mistake made than the comparatively common one of the past few years, made in the assumption that there is but slight difference between the several types or makes of elevators offered in competition. The difference is not theoretical, or of little value, but to the contrary, becomes clearly apparent to any intelligent, disinterested investigator, and the records of years prove that the difference is material and of great practical value. Severe competition, and the demand of purchasers for low prices, have been responsible for much of the defective elevator work which is too plainly in evidence; when, however, this yielding to an unreasonable demand leads, as it has done, to the cheapening of construction to that extent, that not only the property, but the lives of clients and the general public have been in danger, the manufacturers cannot be too strongly condemned by those who appreciate the facts. This is especially true because the best interests of clients cannot be served by lessening the cost of elevator construction at the expense of quality. A single elevator accident may easily cost the owner of the building much more than the amount of money saved in the original expenditure. The cost of repairs necessarily required upon an improperly constructed elevator plant comes to be in a few years a heavy tax. The difference in durability is so great that the properly constructed plant will outlast two of cheap manufacture. These statements are not theoretical, but are based upon facts which may easily become apparent to any who care to investigate. In the investigation the condition should be made that the dividing line should be drawn between the theoretical and the actual. An illustration of the great extravagance incident to the use of improper machinery which can be purchased at materially less first cost is found in some elevator pumping plants.

The results of a careful investigation prove that there are large elevator plants in operation operated by water supplied by the ordinary type of pumping-engine, which cost the owners of the buildings a number of thousands of dollars annually more than they should on account of defective and ill-proportioned elevator machinery and pumps. These results are obtained not only by estimates based upon the well-known difference in efficiency between the types compared, but through an examination of the records of the cost of coal for operation. This waste of money has continued for years and only very recently have the advocates of proper construction succeeded in making an issue upon this impor-

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tant point in a limited number of instances, to the material advantage of the most interested parties.

As the leading advocates of the value of the most improved construction, the Winslow Bros. Elevator Co., will take great pleasure in making known to any interested party the material economy effected by the use of the Riedler Pumping Engines, for which they have the agency. These pumps, the invention of an eminent German engineer, have a record of years, unequalled on account of their superior efficiency. While only quite recently introduced into America, their construction is such that an expert is not needed to see the reason why they are so admirably adapted to serve the comparatively irregular requirements of elevator service, and why we are prepared to guarantee an efficiency in service which is not even approximately equalled by any other pumping-engine which has been offered for similar service. In simplicity, durability, smoothness of motion and high efficiency under variable duty, the Riedler Pump is very remarkably adapted to serve the requirements of elevator service in large buildings. By its use all of the well-known advantages of the hydraulic passenger elevator are preserved with the additional low cost of operation, which has been sought after by the advocates of other systems so ardently that economy has been exaggerated into a quality of greater importance than either safety or efficiency.

The elevator problem is not a complicated one, but is easily solved by the investigator who dares trust his own judgment of facts presented.

WINSLOW BROS. ELEVATOR CO.,
CHICAGO, ILL.

GOULDS POWER PUMPS.

THE Goulds Mfg. Co., Seneca Falls, N. Y., report the following sales of the Power Pumps:

Winnipiseogee Paper Co., Franklin, N. H., one 14″ x 10″ and one 12″ x 10″ Double Acting Suction Pump, for use with paper machines, and one 7″ x 8″ Stuff Pump for pumping stuff to paper machines.

Archibald Rogers, Hyde Park, on Hudson, N. Y., one 2½″ x 4″ Triplex Pump for water-supply.

Capital Electric Light, Motor & Gas Co., Boise, Idaho, one 1¾″ x 2½″ Triplex Pump, for water-supply.

F. S. Blackall, New York, one 1¾″ x 2½″ Triplex Pump for water-supply.

N. O. Railway & Mill Supply Co., New Orleans, La., one 5″ x 6″ Triplex Pump. These pumps are operated by electric motor direct geared, all being mounted on one bed-plate.

Jay Paper Mfg. Co., Jay, Me., one 7″ x 8″ Triplex Pump, for pumping stuff to paper machines.

Hendricks Mfg. Co., Detroit, Mich., one 5″ x 8″ Triplex Pump, for pumping calcium brine.

Herkimer Paper Co., Herkimer, N. Y., one 5″ x 8″ Triplex Pump, for boiler feeding.

Nahum Perry & Co., Attleboro, Mass., one 7″ x 8″ Triplex Pump, for water-supply.

Thorndike Mfg. Co., Thorndike, Mass., one 4″ x 6″ Triplex Pump, for water-supply.

Tide Water Oil Co., Bayonne, N. J., eight 4″ x 6″ Triplex Pumps, for water-supply and other pumping operations of refinery work.

Nairn Linoleum Co., Leward, N. J., one 4″ x 4″ Triplex Pump, for water-supply.

Goodell & Co., Antrim, N. H., one 1¾″ x 2½″ Triplex Pump, for pumping feed-water.

S. W. Luitweiler, Los Angeles, Cal., one 6½″ x 8″ Triplex Pump, for water-supply.

Hourd Iron Works, Buffalo, N. Y., one 8″ x 8″ Triplex Pump, for water-supply.

City of Forest, Ill., one 8″ x 10″ Triplex Power Pump for water-works.

City of Hartford, Wis., one 8″ x 8″ Triplex Power Pump for water-works.

Craig Oil Co., Toledo, Ohio, one 2″ x 6″ Triplex Power Pump for pumping oil, and two 5″ x 8″ pumps for water pumping.

Massachusetts Mills in Georgia, one 8″ x 10″ Triplex Power Pump for a water-works plant at Linsdale, Ga.

Lunenberg Water Co., Lunenberg, N. S., one 8″ x 10″ Triplex Power Pump to be operated by water-wheel for water-works supply.

Media, Pa., two 6½″ x 8″ Triplex Power Pumps to be operated by water-wheel for water-works supply.

Webster & Meathe, Detroit, Mich., one 1¾″ x 2½″ Triplex Power Pump.

Hendricks Mfg. Co., Ltd., Carbondale, Pa., one 6½″ x 8″ and one 2½″ x 6″ Triplex Power Pump.

Plattsburg Light, Heat & Power Co., Plattsburg, N. Y., one 1¾″ x 2½″ Triplex Power Pump to be operated by electric motor.

Otis Falls Pulp Co., Livermore Falls, Me., one 7″ x 8″ Triplex Power Pump for pumping paper stuff.

Prof. L. A. Wait, Ithaca, N. Y., one 4″ x 4″ Triplex Power Pump.

W. J. Cooper & Cole Bros., Lincoln, Neb., one 6½″ x 8″ Triplex Power Pump.

Mineral Farm Consolidated Mining Co., Aspen, Col., one 6½″ x 8″ Triplex Power Pump and 5 H-P. motor for operating it.

The Southwork Co., Mittineague, Mass., one 5″ by 8″ Triplex Power Pump with brass base for pumping paper stuff.

Berlin Mills Co., Berlin, N. H., one 7″ x 8″ Triplex Power Pump for pumping paper stuff.

Rawitzer & Bros., Stratford Springs, Conn., one 7″ x 8″ Triplex Power Pump.

Church & Co., Trenton, Mich., one 8″ x 10″ Triplex Power Pump for pumping hot liquor.

Bagnall & Hilles, Yokohama, Japan, one 5″ x 8″ Triplex Power Pump to be driven by electric motor.

Jones & Lamson Machine Co., Springfield, Vt., one 3″ x 4″ Triplex Power Pump.

The Company also reports that it has sold to the City of Memphis, Mo., a 8″ x 10″ Waterworks Pump, having capacity of 375,000 gallons a day; and to the City of Oregon, Ill., a 10″ x 12″ Triplex Waterworks Pump, having capacity of 750,000 gallons a day; and to Mass. Mills in Georgia, Rome, Ga., a Triplex Pump for waterworks, having a capacity of 375,000 gallons a day. This Pump is to be used to supply water to Linsdale, Ga.

THE GOULDS MFG. CO.
SENECA FALLS, N. Y.

"CHAMPION" WATER HEATER.

THE successful architect is always ready to adopt new devices and improvements in the fitting-up of the buildings he creates, but he is always conservative in such matters and must first be thoroughly satisfied as to the real value of such device or improvement. It must add to the comfort and convenience of those who will occupy the home, must be a "money-saver" and, above all, must be safe. There can be no better proof of the value or utility of such an article than its adoption by good architects.

The Champion Water Heater, invented but a year ago, is always in succeseful operation in fine residences and other buildings from Maine to the Pacific coast, and is being specified by many of our best architects.

It claims to be the best and most economical water heater on the market and is perfectly safe. R. J. Dillon Co., 2-4 South Canal Street, Chicago, will be very glad to show the Heater in operation at their office, or to correspond with any one who wants a bountiful supply of hot water for domestic or other purposes. See advertisement in this paper.

R. J. DILLON CO.
CHICAGO, ILL.

EXTRACTS FROM REPORT OF THE SPECIAL COMMITTEE OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS UPON THE PRESERVATION OF WOOD.

A SPECIAL Committee of the American Society of Civil Engineers, detailed to investigate the subject of the preservation of wood from decay, has spent four years in practical experiment and observation, besides inquiry into the experiments and conclusions of others extending over a period of more than thirty years. Their investigations included all the established methods of preservation, such as treatment with creosote, zinc salts, etc., and also with the products of petroleum. The latter have been claimed by many to be strong in preserving properties; and as they are very cheap, the substantiation of these claims was of special importance.

The following extracts from the Report of this Special Committee — showing the conclusions deduced of the comparative value of petroleum products, and the best of the established methods — are sent to those whom it is thought should be interested in the subject. The page numbers given refer to the pages of the Report.

Page 265. — "Experiment proved that oil of tar, or creosote, was perhaps the most powerful coagulator of the albumen (of wood), while it, at the same time, furnished a water-proof covering for the fibre, and its antiseptic properties prevented putrefaction."

Page 273. — "There seems to be no question that when creosoting is well done it is effective."

Page 276. — "It thus appears that there is no process of wood preserving the efficacy of which, when well done, is better established than creosoting."

Page 274. — "The conclusion drawn was that crude petroleum, by excluding moisture, would prove a preservative as long as it continually saturated the wood; but that if merely injected once for all, its volatile nature would result in its evaporating and leaving the timber unprotected."

Page 287. — "The pine blocks upon Sixteenth Street (experiment 25) were treated with the residual products of petroleum distillation. It is stated that this was the only process where pressure was used. In from three and a half to four and a half years the blocks were badly decayed, and large portions of the street were almost impassable, while other streets paved in the same year with untreated woods remained in fair condition."

REFLECTORS.

THE drill hall of the new armory of the 14th Regiment N. G. S. N. Y. has been fitted

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with thirty of I. P. Frink's celebrated Reflectors. Each Reflector is fitted with fifty gas-burners, making a total of 1,500 points of light when all are lit. The gas-jets, aided by the Frink Reflector will light up the drill floor brilliantly.

I. P. FRINK,
551 PEARL STREET, N. Y.

THE TAYLOR "OLD STYLE" BRAND OF ROOFING TIN.

MESSRS. N. & G. TAYLOR CO. manufacturers of the Taylor "Old Style" brand of Roofing Tin, Philadelphia, are out in a neat advertisement. It is a four-leaf folder, on heavy paper, printed in two colors in attractive type. It is entitled "A Roofing Tin that will last as long as the Building." They also devote a page to the "Secrets in the Tinplate Trade," and go on to say that "the secrets" in the Tinplate trade are in the producing of plates that appear other than what they are. The circular also states that their special brand, the Taylor "Old Style," is the only plate made to-day exactly the same as in 1830, since which time it has never caused a complaint. To those interested in good Roofing Tin, we would suggest that they write to the N. & G. Taylor Co., Philadelphia, and secure samples and prices. This firm has always enjoyed the reputation of handling the best of goods.

N. & G. TAYLOR CO.,
PHILADELPHIA, PA.

TO ARCHITECTS.



Gentlemen, — We have sent you, at different times, circulars, with a view of informing those who desire the best of window glass through the proper source. Our constant aim is to fill the requirements of those who want nothing but the very best. We are now sending out the most complete and accurate price-list published. We can also furnish price-lists of our 26 oz. Crystal Sheet, and will mail you either or both free of charge upon solicitation. We would ask you to specify "Chambers Eagle Brand" of window glass in your drawings, and we will be pleased to answer any questions or give you any information at our command.

Very respectfully yours,
CHAMBERS GLASS CO.,
1442 MONADNOCK BLOCK, CHICAGO.

ENAMELLED BRICK.

BESIDES furnishing Enamelled Brick for the Marquette-Reliance and Atwood Buildings of Chicago, the Tiffany Pressed Brick Co. have recently secured the contract for furnishing them for the following buildings: Guaranty Building, Buffalo, N. Y.; Hoster Brewery, Columbus, Ohio; Gas & Electric Co., Oberlin, Ohio; Court House Powerhouse, Toledo, Ohio; Mabley Building, Detroit, Mich.; Chicago & Alton R. R. Depot, Springfield, Ill.; and Deaf and Dumb Institution, Jacksonville, Ill.

TIFFANY PRESSED BRICK CO.,
CHICAGO, ILL.

NOTES.

THE Goulds Mfg. Co., of Seneca Falls, N. Y., have done a rather clever thing in sending out, as a circular, a simple alphabetical index of the great variety of apparatus in the way of pumping machinery they manufacture. One who has need either of hydraulic apparatus, or the tools needed in their setting-up and operation, has only to run his eye over this list in order to discover whether or no this great concern can supply his needs.

THE new catalogue of the Stanley Works, of New Britain, Conn., is, of course, intended to be useful to the hardware trade rather than to architects, and yet there are so many occasions when, in getting out the working-drawings of inside finish, it is desirable to know just what form of hinge there is that will fit the case in hand, that architects will find the illustrations in this catalogue of every-day use.

While the manufacture of *Wrought*-steel Hinges is the main occupation of this manufactory, it is far from being the only one, for one has only to turn the pages to discover that the output includes a variety of door-bolts, blind-fixtures, shutter-openers, sash-lifts, brackets, braces, etc., made either of wrought-steel or malleable iron and finished in divers ways.

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AMERICAN ARCHITECT AND BUILDING NEWS CO., Boston, Mass.

BUILDING INTELLIGENCE.

Reported for the American Architect & Building News.

ALTERATIONS AND ADDITIONS.

Chicago, Ill. — Thomas Brace, 3 two-st'y brick front additions to 159-163 W. Washington St.; $3,000.

E. Burkhardt, three-st'y brick addition to front 940 N. Clark St.; $5,000.

A. Beucher, one-st'y brick front addition to 283 Dayton St.; $5,500.

Denver, Col. — *Fairview Ave., N. D.*, addition to Consumptives' Home; $25,000; own., Episcopal Church; arch., Varian & Sterner.

Nashua, N. H. — *Pearl St.*, interior alterations to brick church; $12,000; own., Pearl St. Universalist Society; arch., Arthur F. Gray, Boston; contract let.

St. Louis, Mo. — Two-st'y addition, Longfellow School building; $6,000; own., St. Louis Board of Public Schools; bld., Dum Bros.

Worcester, Mass. — *Chestnut St.*, one-st'y addition to private dwell.; own., J. Russell Marble; arch., J. Wm. Patston; con., C. A. Vaughn.

APARTMENT-HOUSES.

Chicago, Ill. — Wm. Wright, three-st'y brick flats, 216 Washtenaw Ave.; $6,500.

L. Eggleston, three-st'y brick flats, 763 Tolman Ave.; $5,000.

J. Klosonaz, three-st'y brick flats, 753 Haddon Ave.; $5,000.

M. Falkenberg, three-st'y brick flats, 786 Maplewood Ave.; $5,000.

BUILDING INTELLIGENCE.

(*Apartment-Houses Continued.*)

J. H. Norton, three-st'y brick flats, 88 Heine St.; $5,000.

T. F. Robinson, two-st'y brick flats, 2283 Adams St.; $3,000.

J. Weber, three-st'y brick flats, 55 Osgood St.; $3,000.

O. Daniels, three-st'y brick flats, 1038 Fairfield Ave.; $3,000.

P. Foley, three-st'y brick flats, 2070 Wilcox Ave.; $4,000.

Fred Mensen, two-st'y brick flats, 661 Logan Sq.; $3,000.

Frank Simmons, two-st'y brick flats, 44 Bowman St.; $6,000.

Jno. L. Young, two-st'y brick flats, 6414 Green St.; $3,000.

Ole Larson, 2 two-st'y brick flats, 4846-4848 Calumet Ave.; $16,000.

James J. Young, two-st'y brick flats, 6414 South Green St.; $3,000.

Ola Larsen, 2 three-st'y brick flats, 4846-4848 Calumet Ave.; $16,000.

F. Robertson, 2 three-st'y brick flats, 1212-1214 Sheffield Ave.; $14,000.

L. J. Nicholson, two-st'y frame flats, 107 Carmen Ave.; $3,000.

C. W. Nordquist, three-st'y brick flats, 799 Kedzie Ave.; $3,500.

D. C. Butts, three-st'y brick flats, 5650 S. Green St.; $5,000.

D. C. Butts, three-st'y brick apartment building, 5651-5653 South Green St.; $5,000.

F. R. McMullen, three st'y brick flats, 698 Washington St.; $8,000.

Geo. Korn, 2 three-st'y brick flats, 5201-5203 Kimbark Ave.; $15,000.

Jno. A. Anderson, three-st'y brick flats, 1278 Wilton Ave.; $4,500.

W. Ward, two-st'y brick flats, 871 Millard Ave.; $4,000.

Thos. Kwasneeski, two-st'y brick flats, 144 Cleaver St.; $4,000.

Denver, Col. — *Fifteenth St. and Broadway*, brick apart.; $125,000; own., G. S. McMurtrie; arch., F. E. Edbrooke.

New York, N. Y. — *Sixty-ninth St.*, n w cor. West Central Park, seven-st'y brick flats, 50′ x 96′, 80′ high, flat star roof; $120,000; own., Michael Gillespie, 96th St. and 5th Ave.; arch., Geo. Keister, 140 West 34th St.

Bathgate Ave., e s, 130′ n 172d St., 4 four-st'y brick flats, 25′ x 75′, 48′ high, flat tin roofs; $56,000; own., Myron C. Burton, Woodlawn Heights; arch., W. Orniston Tait, 1236 Madison Ave.

East Eighth St., No. 309, five-st'y brick flats, 24′ x 59′ x 72′, 57′ high, flat tin roof; $18,500; own., John G. Van Camp, 243 Broadway; arch., Thomas Graham, 1236 Madison Ave.

Thirty-fourth St., s s, 228′ e 2d Ave., 3 five-st'y brick flats, 23′ x 88′, 55′ high, flat tin roofs; $60,000; own., Bernhard Blumenthal, Long Island; arch., Mowbray & Uffinger, 163 West 23d St.

Ridge St., No. 56, five-st'y brick flats, 25′ x 88′, 60′ high, flat tin roof; $20,000; own., Bena Noeff, 334 East 123d St.; arch., Horenburger & Straub, 122 Bowery.

Third Ave., e s, 62′ s 49th St., five-st'y brick flats, 39′ x 85′, 58′ high, flat tin roof; $25,000; own., Richard Riker, 26 East 62d St.; arch., James W. Cole, 403 West 51st St.

One Hundred and Fifty-sixth St., s e cor. Melrose Ave., 4 four-st'y flats, 25′ x 38′ x 68′, 48′ high, flat tin roofs; $45,000; own., Mayor Goldsmith, 29 East 79th St.; arch., Gustav Schwarz, 554 East 158th St.

One Hundred and Fifty-third St., s s, 400′ West 10th Ave., five-st'y brick flats, 25′ x 88′, 57′ high, flat tin roof; $20,000; own., J. M. Clenahan, Port Chester; arch., G. F. Pelham, 503 Fifth Ave.

One Hundred and Thirtieth St., s w cor. Convent Ave., five-st'y brick flats, 25′ x 138′, 58′ high, flat tin

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is the strongest and most serviceable Cement made, and will permit the admixture of a larger amount of sand or gravel with less loss of strength than any other brand; it is therefore the most economical. It is the finest ground cement made, and has the largest bulk to the barrel.

The following test, made in actual work, by Col. D. C. Houston, Corps of Engineers, U. S. A., at the sea wall around Governor's Island, New York Harbor, has never been equalled by any other cement. It is as follows: Tensile strength per square inch, one day, 384 pounds; seven days, 600 pounds; thirty days, 818 pounds.

For Sidewalks it gives the best color, and the most endurable wearing surface. Most of the prominent Railroad Bridges and the large Office Buildings of the country stand upon a foundation of concrete made of ALSEN'S CEMENT.

Alsen's Portland Cement Works, New York Office, 143 Liberty Street.

BUILDING INTELLIGENCE.

(*Apartment-Houses Continued.*)

roof; $40,000; own., Jos. Silverman, 59 West 98th St.; arch., G. F. Pelham, 503 Fifth Ave.

One Hundred and Twenty-second St., n s, 22′ w Lexington Ave., five-st'y brick flats, 31′ x 87′, 60′ high, flat tin roof; $20,000; own., H. F. Booth, 358 Washburn Ave., Yonkers; arch., Henry Andrews, Jr., 512 East 117th St.

Third Ave., n s, 130′ n 172d St., 5 five-st'y brick flats, 25′ x 70′, 56′ high, flat tin roof; own., Myra C. Burton, Woodlawn Heights; arch., W. O. Tait, 1236 Madison Ave.; $72,000.

Lenox Ave., e s, 50′ s 135th St., 2 five-st'y brick flats, 25′ x 69′, 56′ high, flat tin roof; own., Higgins & King, 1190 Madison Ave; arch., Thomas Graham, 1236 Madison Ave.; $32,000.

Bergen Ave., e s, 55′ s Grove Street, four-st'y brick flat, 26′ x 59′, 47′ high, flat tin roof; own., John L. Mead, 590 East 141st St.; arch., John De Hart, 1637 Fox St.; $15,000.

West Twenty-seventh St., Nos. 119-123, 2 five-st'y brick flats, 25′ x 87′, 57′ high, flat tin roofs; $46,000; own., Lawson & Quackenbush, 125 West 127th St.; arch., M. V. B. Ferdon, 1760 Broadway.

Madison Ave., w s, 60′ n 116th St., 2 five-st'y brick flats, 20′ x 89′, 66′ high, flat tin roofs; $25,000; own. and arch., S. D. Cohen, 80 East 70th St.

One Hundred and Twelfth St., n s, 225′ w Amsterdam Ave., 3 five-st'y brick flats, 25′ x 84′, 57′ high, flat tin roofs; $54,000; own., N. A. McBride, Averne, L. I.; arch., F. T. Camp, 114 Nassau St.

One Hundred and Twelfth St., n s, 140′ w Amsterdam Ave., 2 five-st'y brick flats, 20′ x 86′, 57′ high, flat tin roofs, $42,000; own., N. A. McBride, Averne, L. I.; arch., F. T. Camp, 114 Nassau St

Sixty-sixth St., ns, 225′ East Columbus Ave., 2 five-st'y brick flats, 25′ x 90′, 63′ high, flat tin roofs; $36,000; own., John L. Miller, 85th St. and Riverside Drive.

West Fifty-first St., No. 544, five-st'y brick flats, 25′ x 96′, 59′ high, flat tin roof; $17.000; own., Margaret L. King, 322 West 14th St.; arch., David W. King, 96 Fifth Ave.

West Forty-third St., Nos. 220-230, 4 five-st'y brick flats, 25′ x 89′, 59′ high, flat tin roofs. $80,000; own., Wm. F. Rohrig, Mount Vernon; arch., Charles Rentz, 153 Fourth Ave.

St. Louis, Mo. — Two-st'y flats, Manchester St., bet. Tower Grove and Newstead Sts.; $5,000; own. and bld., Wm. S. Drozda.

Two-st'y flats, s s Laclede St., bet. Vandeventer and Sarah Sts.; $5,800; own., Edward Butler; bld., C. B. McComrack.

Two two-st'y flats, s s Geyer St., bet. 2d, Carondelet and Dolman Sts.; $4,300; own., Mrs Lenka; bld., R. Doersti.

HOUSES.

Baltimore, Md. — Three-st'y brick dwell., n e cor. Whitelock St. and Madison Ave.; own., A. B. Whitelock, 2401 Madison Ave.

Three-st'y brick dwell., s s Elliott St., e Chesapeake St.; own., Albert Wagner, 2828 Elliott St.

Five two-st'y brick dwells., e s Friendsbury Pl., n Northwest St., and 4 two-st'y brick buildings, w s Fulton Ave., n Northwest St.; own., Richard M. McSherry, 14 East Lexington St.

Three three-st'y brick dwells., n s Fayette St., bet. Fulton and Monroe Sts.; own., Pat'k Walsh, 1816 West Fayette St.

Three three-st'y brick dwells., n e cor. Cathedral and Centre Sts.; own., A. L. Gorter, 424 Equitable Building, cor. Calvert and Fayette Sts.

Philadelphia, Pa. — *Frankford Ave., No.* 3415, three-st'y brick dwell., 15′ x 57′; con., Samuel Carver.

Ridge Ave., n Fleeson St., three-st'y stone and brick dwell., 18′ x 64′; con., F. H. Sheldrake, Bala

Jasper St., n Allegheny Ave., 6 two-st'y brick dwells., 15′ x 43′; con., Thos. Baker.

Newkirk St., cor. Oakford St., two-st'y brick dwell., 16′ x 38′; own., Hugh Gaynor, 2015 Federal St.

Newkirk St., e s, above Wharton St., 19 two-st'y brick dwells., 14′ x 28′; own., Hugh Gaynor, 2015 Federal St. (The cost of the *two* above operations will be $38,000.)

Cambridge St., e Church St., 2 two-st'y brick dwells., 14′ x 26′; own., John Miller.

Lee St., n Ontario St., two-st'y brick dwell., 14′ x 42′; con., Thos. H. Holton.

E St., below Clearfield St., 17 two-st'y brick dwells., 14′ 6″ x 25′; own., Jacob Marsch.

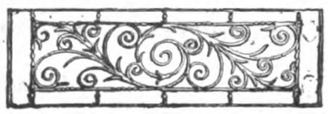
Hagart St., s s, w 25th St., two-st'y brick dwell. and stable, 15′ x 45′; con. Paul & Hainbach.

York St., n s, w 25th St., two-st'y brick dwell. and stable, 15′ 6″ x 45′; con., Paul & Hainbach.

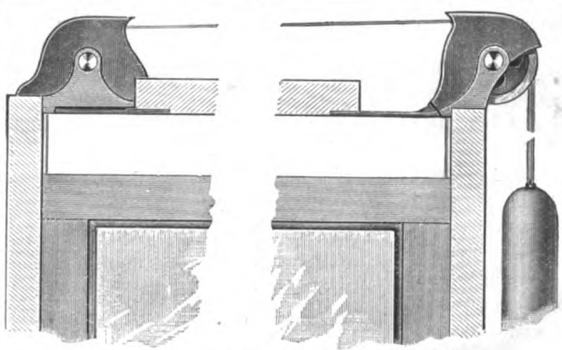
Ridgefield, Conn. — Three-st'y frame dwell., 45′ x 30′; own., N. L. Rockwell; arch., Christopher Meyers, 361 Broadway, New York City.

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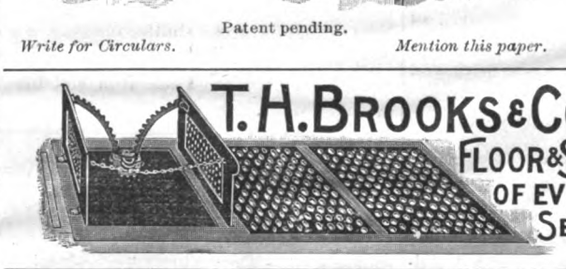
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BUILDING INTELLIGENCE.

(*Houses Continued.*)

Somerville, Mass. — *Wesley St., No.* 20, frame dwell.; own. and bld., Hudson & Lewis.

Elm St., No. 59, frame dwell.; own., Wm. H. Zinn; bld., N. S. Smith.

Somerville Ave., No. 133, frame dwell.; own. and bld., Norton & Scott.

Hudson St., frame dwell.; own., W. H. Marshall; bld., Belding Bros.

So. Norwalk, Conn. — *Riverside Ave.*, frame dwell.; $4,000; own., Rufus Osborne; arch., H. Morehouse.

St. Louis, Mo. — Two-st'y dwell., n s Carter St., bet. Hamilton and Wabash R. R.; $4,500; own., E. Conley; bld., C. E. Wenzel.

Two-st'y dwell., s s Cleveland St., bet. Grand and Spring Sts.; $3,500; own., M. Wetter; bld., H. Grenemeyer.

Two-st'y dwell., s s Page St., bet. Union and Belt Sts.; $5,000; own. and bld., W. White.

Two st'y dwell., n s Euclid St., bet. Cote Brilliante and Leduc Sts.; $7,000; own., Fred Deible; bld., S. H. Frame.

Two-and-one-half-st'y dwell., n s Park St., bet. Mississippi and Armstrong Sts.; $12,000; own., Ernest Luck; bld., F. E. Schroeder.

BUILDING INTELLIGENCE.

(*Houses Continued.*)

Two two-st'y dwells. and stores, e s Kingshighway, bet. R. R. Tracks and Fountain; $12,000; own., Liberty Realty & Building Co.; bld., Ludhaller & Willnuk.

Toledo, O. — Frame dwell., 40′ x 70′; $4,500: own., R. G. W. Foster; arch., L. G. Welker, Marine Building.

Frame dwell., 33′ x 40′; $4,000; own., T. H. De Veaux; arch., Downey & Downey, Detweiler Building.

White Plains, N. J. — Frame dwell., 28′ x 45′; $5,000; bld., Jenks & Plume, Mt. Vernon; arch., W. H. A. Horsfall, Mt. Vernon.

Two and-one-half-st'y frame dwell.; $5,000; own., Philip Brainder; arch., Frank Horton Brown.

Wilmington, Del. — A dwell. will be built for E. C. Hardesty; con., Blackwell & Cassidy.

Worcester, Mass. — *Lisbon St.*, one-and-one-half-st'y frame dwell.; own., A. Dural; con., Dorais & Dupuis.

Kosta St., three-st'y frame dwell.; own., Prince H. Beaudieu; day-work.

Clemence St., two-st'y frame dwell.; own., Mrs. Sophia Holt; con., E. J. Cross.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 160. SATURDAY, OCTOBER 5, 1895. VOLUME I. No. 1032.

HEATING BY HOT-WATER CIRCULATION.

THE problem of erecting a hot-water apparatus is not a difficult one, *i. e.*, to so plan and erect the piping as to give the freest possible circulation in the system, to proportion the size of pipe, and take off branches in such a manner as to make every radiator equally effective. Locate heater in cellar, close to chimney and convenient for piping, and at lowest level possible; the lower the heater is set the greater the motive power, and the quicker the circulation in the system.

Hot-water circulation depends entirely upon gravitation; this must be accepted by the hot-water engineer without reserve or question in order to obtain uniform success in setting up apparatus. When the system (properly placed) is ready for operation, the water in the heater and system is in perfect balance. Upon building a fire in the heater, circulation begins, first in the heater itself, the units of heat passing from the fire to the water immediately surrounding the fire, causing it to expand and rise to the top of the heater because of its decreased density, the colder water settling to the bottom. Immediately the whole of the water in the heater becomes warmer than in the return-pipes, the balance is disturbed, and the colder water in the returns being heavier, falls by its own specific-gravity and forces the water out of the heater, slowly at first, but with accelerated movement as the intensity of the fire increases.

If what we have said in the foregoing lines is not accepted, we can assure our reader that he can have no success in low-pressure hot-water heating.

SYSTEMS.

There are two systems: first, the low-pressure or open-tank; second, the high-pressure or closed-tank. We are advocates of and believers in the *low-pressure* or *open-tank principle*, and recommend it in preference to any other, both on account of its *absolute* safety and economy of fuel. There is no economy in heating water under pressure, and though admitting you can get a higher temperature, it is only achieved with increased consumption of fuel, consequently there is no economy about the system. One of our first claims is that of economy, and we maintain that the only correct and safe principle is the adoption and installation of the apparatus upon the low-pressure or open-tank system, and with a well-balanced apparatus, a mercurial thermometer, and proper regulation of the draughts, all boiling over or annoyance in that direction can be avoided. With a correctly designed hot-water apparatus and with sufficient heater capacity, the temperature of water can easily be maintained in cold weather at 200° Fahr., or even higher (according to the elevation of the expansion-tank), and we have never known an apparatus a failure where this result has been accomplished with proper proportion of radiation. A closed-tank system is positively dangerous, and should not be allowed to be installed in any home, and we can cite instances where heaters have exploded, and even radiators have been broken, causing great damage and annoyance, when put in under pressure or closed-tank system. With the low-pressure system there is absolutely no danger from fire or explosion, while from the closed-tank or high-pressure there is a possibility, and the fitter will have more comfort and better success if he will adapt himself to the principles of the low-pressure or open-tank system. In speaking thus confidently, we are advocating no mere theory, but a fact that we in common with all thorough hot-water-heating engineers have demonstrated, and we must excuse ourselves to the educated engineer for urging these well-known facts of applied science, by instancing the many jobs which have come under our observation, where pressure and not *gravitation* was depended upon for circulation, the inevitable result being a "freaky," dangerous, wasteful and imperfect heating-apparatus.

We would say more if we knew how to enforce adherence to the principle advocated in setting all hot-water heating-apparatus.

Keeping in mind, then, the general principles, the methods of application are readily understood, and we respectfully ask for a careful study of the following observations:

We recognize in advance the impossibility of giving an unvarying rule applicable to every case, such, for instance, as to the quantity of radiating surface required, as the climate of the different States varies greatly, and the quality and exposure of buildings must always be a factor in determining, not alone the amount of radiating surface required, but also the size of the heater itself.

TWO-PIPE SYSTEM. — (HOT WATER.)

For a two-pipe system start flow-pipes from top of heater, giving them a slight incline to the radiators of not less than one inch in ten feet, and the return-pipes a corresponding decline towards heater, and, as far as is practicable, run flow and return pipes side by side, or the return-pipe below the flow.

Right and left connections or flanged unions should be used in the flow and return pipes near heater, for the purpose of disconnecting easily at any time if necessary.

Avoid all "pockets" or "air-traps," and the use of fittings which retard the circulation. All pipe and fittings should be examined before being placed, to make sure there are no obstructions, and all burrs on pipe should be carefully removed.

All fittings should be of the best gray iron.

All flow and return pipes should be suspended securely to joists overhead, making the ordinary provision for expansion and contraction. Cast or forged wrought-iron hangers are the best and neatest to use. Forty-five-degree elbows and long-turn fittings should be used wherever practicable, to give the freest movement possible to the circulation.

Flow and return pipes on ordinary jobs will average from 20 to 25 per cent of the direct radiating surface.

Never use crossway or *bullhead* tee-joints on flows and returns or risers, but break currents. In reducing, use the proper reducing fittings and avoid bushings as far as possible. Care must be taken to keep the pipes and fittings scrupulously clean, so as not to prevent the circulation of water in a radiator. Joints are best made by using a small portion of good lead mixed with boiled oil, and thinly spread on. Each radiator or coil must be provided with an air-valve fixed at its highest point; those operated with a key-wrench are the best kind to use.

Use as few mains as is consistent with the character of the work under consideration. Both plans have their advocates, some preferring a series or number of pipes in circuits about two inches in diameter or less, and others preferring one full-size main flow-pipe, with branches taken off; both plans have their own peculiar advantage. Suffice to say that either plan if skilfully erected will give good results; the question of cost also, at times, is a consideration.

NOTE. — "It is so very necessary to impress upon the student that it is the superior weight of the colder water (and this alone) that brings about the movement of the particles, and ultimately the mass, of the liquid. It seems so natural to hear it argued that it is the fact of the hot water being lighter than the cold, that brings about the circulation, whereas it is just the reverse.

"A distinction without a difference, some may say, but it is far from being so, as every practical man knows how many errors are fallen into through considering the ascending properties of hot water instead of the superior descending force of cold water, when working-out some problem." — *F. Dye.*

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The size of main flow-pipe should be governed by the amount of radiating surface it has to supply.

"It has been supposed by many persons that, where two or more circulating-pipes are attached to one main pipe, the area or section of the main pipe ought to be equal to the sum of the areas of all branch pipes. This idea has led to most inconvenient arrangements, having been resorted to in particular cases. In some instances pipes as large as nine inches diameter have been used for main pipes, where those of four inches would have answered the purpose infinitely better; and other proportions equally erroneous have frequently been adopted."—*Hood.*

The following table will serve to some extent as a guide to the fitter:

	Main.	Branches.
1″	supplies two	¾″
1¼″	"	1″
1½″	"	1¼″
2″	"	1½″
2½″	"	1½″, one 1¼″; or one 2″, one 1¼″
3″	"	one 2½″, " 2″; " two 2″, " 1½″
3½″	"	two 2½″, " 3″, one 2″; or three 2″
4″	"	one 3½″, " 3″; or two 3″; or four 2″
4½″	"	" 3½″, " 3″; " one 4″, one 2½″
5″	"	" 4″, " 3″; " " 4½″, one 2½″; or eight 2″
6″	"	two 4″, " 3″; " four 3″; or ten 2″

The area of the main should in some cases approximate the sum of the areas of its branches, although it can be less. Flow and return pipes should be of the same size and have the same connections.

One-pipe, or "continuous-circuit" system.

In adopting the one-pipe or continuous-circuit system, care must be exercised in its erection. The circuit pipe or main should be run on a perfect level, continuing its original size, and kept, say, two to four feet from cellar wall, the flow connections to radiators being taken off the main with a tee looking up, the return from radiator entering a tee on same main, on the side. The connections to radiators and expansion-tank, as well as other details, are carried out same as in the two-pipe system. The main flow-pipe, as it returns to the *heater*, should have a *slight* incline towards it, the connections from main to radiators should pitch upwards towards the radiator, the returns having a corresponding fall or incline.

Open-tank system.—(Overhead circulation.)

A hot-water apparatus can also be made to do efficient service when it is necessary to place heater upon the same level as the radiating surface, first, by carrying a flow-pipe from heater into an ordinary expansion-tank, which should be elevated as high as possible above it. This tank should open to the atmosphere, and from the bottom of it carry a main flow-pipe suspended to the ceiling overhead, taking off connections from tees in main, by dropping down and supplying radiators at top, carrying the main return-pipe along or underneath the floor, as convenient, back to the heater, connecting the returns from radiators into it. This system has many advantages for heating radiation upon the same level as the heater or below it. First, carrying the water direct from the heater into an open tank allows for the freest escape of air or steam; it also facilitates the circulation by increasing both the actual as well as the relative weight of the descending column of water. We are aware this class of apparatus is often erected by the use of a safety-valve on the expansion-tank, and the idea seems to prevail among some engineers that this is a necessity and that the apparatus would not work without it, and that they must have pressure to force the circulation around, so to speak; but if the apparatus is erected as suggested, gravity will give all the circulation needed. It is sometimes argued that more heat can be had by heating water under pressure by using a safety-valve on expansion-tank, and that it also prevents the tank steaming and boiling over. Grant it; we then come back to the question of *safety* and *economy*, for, as previously stated, any increase of temperature above two hundred degrees is only obtained by increased consumption of fuel; consequently there is no economy about the apparatus, which is one of our first claims. By making the expansion-tank large, generous, and carrying a comparatively low-water line, and leaving plenty of room for expansion of water, the danger of boiling over or of wasting heat is very slight, and after the apparatus has become warm throughout, and equalized, it can be operated with very moderate firing. We heartily commend this plan where heating upon the same level as heater is necessary.

Under the conditions named above, successful hot-water heating can be applied, and there need be no such word as failure. If it is decided to use a pressure apparatus, extra heavy materials should always be employed in its construction, and this, of course, would increase cost somewhat.

Some fitters also in figuring work have adopted the pressure system on the ground that they can use less radiating surface by heating it to a higher degree of temperature, and so do the work at a lower price. This practice is to be condemned for reasons we have laid down, as well as being unsafe and wasteful in fuel.

Gurney Heater Manufacturing Co.,
Boston, Mass.

THE PREVENTION OF DAMPNESS IN WALLS.

The importance of keeping moisture out of walls need hardly be dilated upon. In addition to the great importance of a dry building for sanitary reasons, it is also most necessary for good construction. Dampness in the masonry soon communicates itself to the woodwork and causes rot throughout the building, besides which, the masonry itself is not sound: the mortar, unless of good hydraulic lime or cement, does not set and is always liable to the attacks of frost.

To give some idea of the quantity of water which the walls of an improperly protected building may contain, and of the evil effect caused by damp, the following remarks are quoted from an official report:

"In England the common bricks absorb as much as a pint or pound of water. Supposing the external walls of an ordinary cottage to be one-brick thick and to consist of 12,000 bricks, they will be capable of holding 1,500 gallons or six tons of water when saturated. To evaporate this amount of water will require nearly a ton of coal, well applied."

The softer and more workable stones are of various degrees of absorbency, and are often more retentive of moisture than common brick.

Sandstone, when deemed fit for building purposes, may contain half a gallon of water per cubic foot, and even granite always contains a certain percentage of water, and in the dry state is rarely without a pint or a half in every cubic foot.

Damp walls or houses cause rheumatism, lower strength, and expose the system to other passing causes of diseases.

In an exposed position, rain will drive through a tolerably stout, solid brick wall, and if water be allowed to drop or fall against it, the wall will become saturated like a sponge, to the great damage of interior finish and plaster, and to the discomfort and annoyance of the occupants.

Within the last few years various expedients have been suggested and tried to obviate the above evil, and now it is generally conceded that the most successful plan for the absolute exclusion of moisture and dampness is to build the wall hollow, that is, making the external wall of the building of practically two distinct walls, side by side, and at a distance apart of from one to four inches, the two sections being securely held together by the Morse Patent Wall Ties, in every fourth course and about two feet apart, the air-space extending continuously from the bottom to the top of the wall.

The wall from the foundation up to the ground-line is built solid, and on the top is formed a damp course, upon which the two walls are built. The portion between the walls thus forms a gutter and is constructed with a fall so as to allow any water that may find its way in, to run down the drains with which the gutter is connected.

The result is, that any moisture penetrating the outer wall finds an impassable barrier in the Morse Wall Ties, which from their peculiar construction do not allow the passage of a single drop of water, but compels the same to drop to the drain below, thus leaving the inner wall absolutely dry.

One of the most important advantages of a hollow, sometimes called vaulted or cavity, wall is the influence it has on the temperature of a house. The two or more inches of air-space in the interior of the wall acts as a non-conductor of heat or cold, and the variations in the atmosphere are not felt to nearly as great a degree as they are when the walls are built solid. In other words, houses built with hollow walls are warmer in winter and cooler in summer.

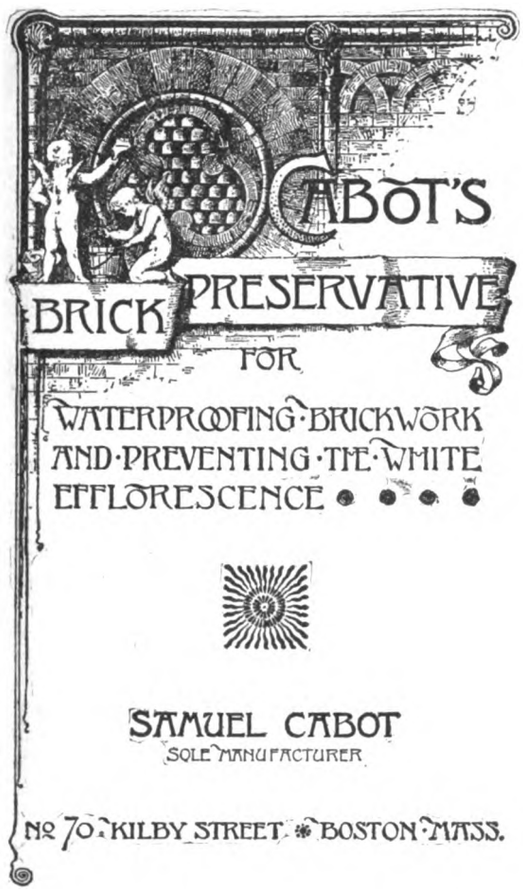
A hollow wall of a given number of brick, securely bonded as above, is a great deal stronger than a solid wall of the same number of bricks, and will also withstand fire much better.

It is the usual practice to build a solid brick or stone wall on the outside and a four-inch wall on the inside. For brick dwellings of not more than two stories, a four-inch wall for the outside should be sufficient, but for much heavier buildings, it is better practice to build the outer wall of the full thickness that would be required of a single wall, and to make the inner wall only four inches in thickness, to serve merely as a furring.

For office-buildings furring blocks are often used for lining external walls, and sometimes hollow bricks are used for the inner four inches of a solid wall, but the latter has not proved a success in excluding moisture. The objection to any kind of furring and to hollow brick is that there must necessarily be some connection between the material of the lining, or furring, and the wall, and this connection invariably allows of the passage of heat and moisture. The better, and only perfect method is to build with an air-space, and connect the lining to the main wall with the Morse Wall Ties.

Sometimes hollow walls are bonded by means of common bricks, extending across the air-space, and built into each wall. This

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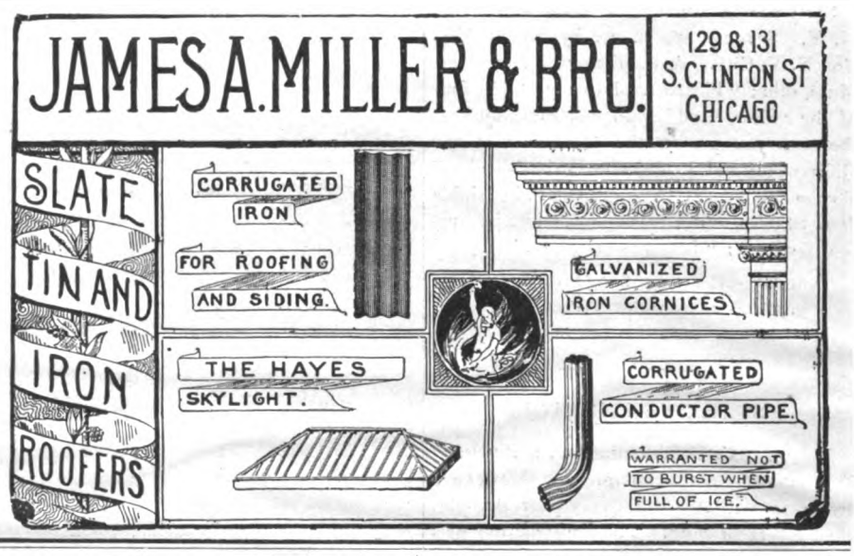
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method of bonding should be absolutely condemned by the architect, and bonding by Morse Wall Ties insisted upon.

Brick bonding permits of the passage of moisture through the wall wherever it is bonded, not only by the moisture passing through the bond brick, but also through the mortar droppings which always collect on top of the brick, thus entirely defeating the object for which the hollow wall was designed.

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GRAPHITE.

WHILE some railroads have used Dixon's Graphite for many years and many master mechanics and engineers are fully aware of its economy and usefulness, we have not until quite lately attempted to bring it more fully before railroad officials and engineers. Lately we have been sending samples to engineers, and the letters and extracts will show how useful even the small samples have proven, and the evident economy, and the saving of oil and dollars if Dixon's Graphite should be generally adopted by railroad companies.

The careful tests made by experienced locomotive engineers demonstrated most conclusively that Dixon's pure flake Graphite is as necessary to a well-equipped engine as an oil-can or a monkey-wrench. For cooling or preventing hot pins and eccentrics, for lubricating journals in truck and driving-boxes, for cylinders and for general use Dixon's Graphite was found indispensable. It gave free and easy action to valve motion. Valves worked free and reserve levers could be held with one hand, even when full boiler pressure was used. The wear of link and valve motion was reduced to a minimum, and the hauling capacity and life of the locomotive greatly increased. It was also found that the engine would work two or three notches closer in cut-off, which affected a saving in fuel and water, and in cylinder and valve-oil. Dixon's finely powdered graphite was used in preference to the regular brand for the check-valves of air-cylinders, for lubricating the equalizing-piston of air-brakes, for preventing "squealing" of air-pumps, and for all delicate or small parts, and for oil-cups with feeding holes too small for the regular graphite. In descending heavy grades, when train has to be held and pump worked to full capacity, lubrication with Dixon's Graphite made a most marked and satisfactory difference.

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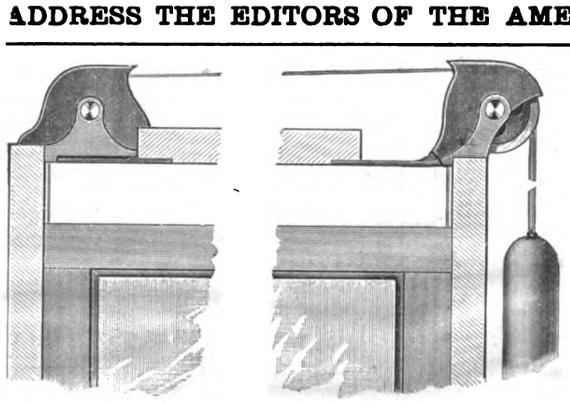
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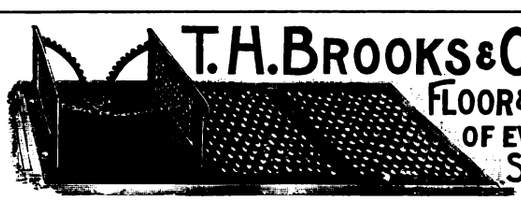
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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 161. SATURDAY, NOVEMBER 2, 1895. VOLUME L No. 1036.

DEXTER BROS' ENGLISH SHINGLE STAIN.

At no time in the building of the American country house have so few clapboards been used as at present. The increased use of shingles, from the small dwelling to the magnificent Newport cottage, is apparent everywhere. This has largely been due to the successful use and lasting qualities of shingle stains. In the use of shingle stains two things are more to be desired than anything else: First, that the stain holds its color, and, second, that it preserves the shingles. Holding of the color is due greatly to the oils which are used and which penetrate the wood. The preserving of the shingles is due more to the goodness of the shingles themselves than to anything the stain can do to improve them in lasting qualities. Shingles on many of the buildings in New England have lasted fifty years. Oftentimes stains are recommended which contain chemicals which are known to be preservative, but only under certain conditions. Certain chemicals will preserve wood which is to be placed in the water or half-buried in the earth, as railroad ties, whereas, if this same chemical is used in shingle stains and exposed to the air, the chemical process which follows simply destroys the fabric and fiber of the shingles, and in a short time charcoals the wood. Oil undoubtedly is one of the best preservatives of wood when the wood is to be left exposed to the atmospheric changes, and the shingle stains manufactured by Dexter Brothers have proved themselves to be unexcelled, as they are wholly oil stains, and the pigments used are finely ground and brought to this country from England. The H. M. Hooker Company, 57 West Randolph Street, Chicago, Illinois, carry all the numbers of Dexter Brothers' English Shingle Stains in stock in large quantities, and they find the demand for them so much greater than ever before that they wish to call the attention of the western architects to the fact that they can supply them direct from Chicago without the necessity of waiting to send all the way to Boston. On the Pacific Coast, Smith & Young, San Francisco and Los Angeles, carry the stain in stock and avoid the delay which would be necessary if they had to have them shipped from the East. These facts should be of interest to the architects who are using these stains.

DEXTER BROTHERS,
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Our new supplementary catalogue No. 24 is devoted exclusively to Elevator Cabs and Enclosures, and embraces several cuts which have not heretofore been embodied in any of our previous catalogues.

We have adopted an enlarged scale for the cuts, thus enabling our customers to form a clear idea of the details. Pages 19 to 25 show various designs for grilles, any of which may be substituted for those used in the cuts.

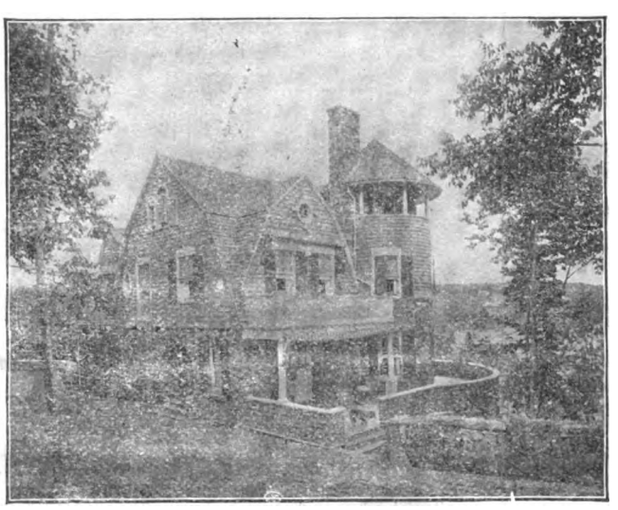
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The tubular construction of our bar gives strength and rigidity, and not using putty or cement which binds the glass, the dangers of expansion and contraction of metal and glass are entirely overcome; then again, the breakage of glass by vibration of train-sheds and other buildings is avoided, as our experience has proven.

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53 Elm St., Boston, Mass.

ROOFS MADE TO LAST.

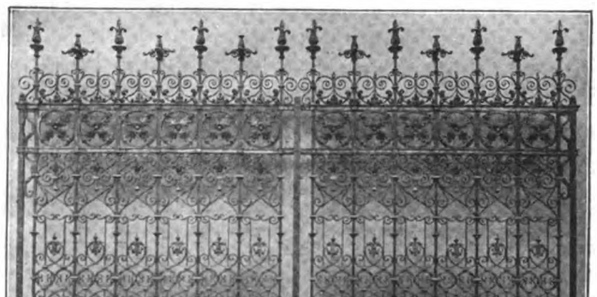
There are points embraced in the Taylor "Old Style" brand of Roofing Tin that cannot be attributed to any other brand made. In fact, the Taylor "Old Style" brand is the only Roofing Tin made to-day exactly the same as Roofing Tin was originally made in 1830, and then handled by our house, and we have roofs in our city that are covered with this brand of Tin that are just as good to-day as when first put on, nearly seventy years ago.

The brand is made by the Palm Oil process entirely. No Acid Flux is used to injure the plate, nor are any rolls or machinery used, each sheet being dipped by hand in open pots of metal by successive immersions. Made as it is, this brand, the Taylor "Old Style," will undoubtedly outlast the life of the building itself. Architects and property owners requiring a good tin roof should mention this brand in their specifications.

N. & G. TAYLOR CO.,
PHILADELPHIA, PA.,

JAMES A. MILLER & BRO.
129 & 131 S. CLINTON ST. CHICAGO
SLATE TIN AND IRON ROOFERS
CORRUGATED IRON FOR ROOFING AND SIDING.
GALVANIZED IRON CORNICES
THE HAYES SKYLIGHT.
CORRUGATED CONDUCTOR PIPE.
WARRANTED NOT TO BURST WHEN FULL OF ICE.

L. HABERSTROH AND SON:
INTERIOR DECORATORS AND PAINTERS
9 Park St. Cor. Beacon
Boston Mass.
Artistic Relief Processes
Tapestry-Leather Mosaic Effects.
Established in 1848
H. F. Bryant, Jr. Del.


PHILADELPHIA BOURSE.
Geo. W. & W. D. Hewitt, Architects.

GATES
18 FEET WIDE BY 14 FEET HIGH
FOR
Main Entrances,
OF
Hand Forged and Hammered
WROUGHT IRON,
Finished in Heavy Electro-Bronze.
MADE BY
THE SNEAD & CO. IRON WORKS,
LOUISVILLE, KY.
Structural and Ornamental Ironwork, Bower-Barff and Electro Plate Finishes.

HOW TO ORDER PUMPS.

A pump should be specially designed for the purpose to which it is to be applied, therefore the purchaser should send, with his order, full information on the following questions:

1. For what purpose is the pump to be used?

2. What is the liquid to be pumped? And is it hot or cold, clear or gritty, fresh or salt?

3. What is the maximum quantity to be pumped per hour?

4. To what height is liquid to be lifted by suction? What is the length and diameter of suction pipe, and the number of angles or turns?

5. To what height or against what pressure is liquid to be forced? What is the length and diameter of delivery pipe, and the number of angles or turns?

6. What is the pressure of steam used?

Be sure that you order a pump large enough for the service intended. Many make the mistake of ordering pumps too small. A slow piston speed is desirable, especially when pumping against heavy pressure.

When you order parts of pumps for repairs, give the shop number, as well as the size number. The shop number is stamped on the top edge of the steam cylinder head and steam-chest head. Duplex pumps have the shop number on a brass plate attached to the water-chest cover.

The Underwriter Fire Pump is merely a pump of the well-known "duplex" type, built in a very substantial manner, and with certain improvements suggested by the experience which insurance inspectors have had with fire pumps.

The principal points of difference between the Underwriter Pump and the ordinary commercial pump are: —

1. Its steam ports and water passages and air chamber are made much larger than in

(Continued on page 4.)

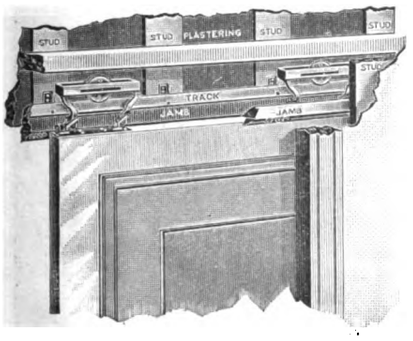
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AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 162. SATURDAY, DECEMBER 7, 1895 VOLUME I., No. 1041

SINGLE-TRACK PARLOR-DOOR-HANGER.



THIS hanger is single track and of the anti-friction type. The single track is hung on one line of studding and the hangers can be put up complete in one-third the time required for others. Perfect alignment. Principal parts of steel. No mortising or cutting of doors. Anti-friction.

In designing our new Single-track Steel Hanger we have striven for absolute simplicity, both in the construction of the hanger and rail, and in the method of putting up. Our past experience of some twenty years in the parlor-door-hanger business enables us to present to the public a hanger that we consider perfect in every respect.

The wheels run on a single steel track; the track being secured to one partition instead of two, as in the case of the common double wood tracks, is not subject to derangement from unequal settling of the said partitions.

The centre of the wheels of this hanger are made of vulcanized fibre, the edge of which forms a rolling surface. This fibre centre forms a solid disc extending to the axle and is firmly held between plates by means of rivets passing through both plates as well as through the fibre.

The axle is made of steel and the bearings are turned perfectly true, making it practically noiseless.

Each hanger may be adjusted independently of the other by the use of a screw-driver and without the derangement of any part.

The principal parts of the hanger are made of the best quality of steel.

The base plates are attached to the top of door without cutting or mortising.

The adjusting screws are $2\frac{1}{2}'' \times \frac{5}{16}''$, specially made, and possess great strength. They are placed at the upper corner of the doors where they can be most conveniently adjusted. The threaded hole in the hanger is countersunk so as to insure an easy entrance of the adjusting screw.

E. C. STEARNS & CO.,
SYRACUSE, N. Y.

THE WORTHINGTON DIRECT-CONNECTED ELECTRIC-PUMP.

THESE pumps can be used for a great variety of purposes, but are especially intended to supply the reservoir tanks of high office-buildings or residences where the pressure carried on the city mains is not sufficient to elevate water above the lower stories.

A novel feature, and one which alone makes them superior to any other design, is the fact that they are direct connected; that is, the motor armature is coupled direct to the pump-shaft, without the intervention of any pulleys, belting or gears. The advantages thus gained are obvious. It means that the apparatus is more compact, and consequently occupies less space. It is absolutely simple, and, therefore, more economical and less liable to get out of order. It requires little or no attention after once being installed, and, most important of all, there being no intermediate mechanism, its operation is smooth and noiseless.

The pump plunger is what is known as the differential type. It is so constructed that, while taking in the water through the suction on the up-stroke only, it delivers equal quantities on both up and down strokes, and as the normal speed is about 600 revolutions per minute, the result is an even and regular flow of water through the discharge-pipe.

Another advantage of the differential plunger is that it equalizes the work, throwing a constant load on the motor for all points in the revolution, which is very essential for safety and durability, as well as for economy.

The pumps are made in three sizes, Nos. 1, 2 and 3, having capacities of 250 gallons, 500 gallons and 1,000 gallons per hour, respectively.

They are designed to work against a head of 100 feet, the actual amount of power consumed varying between one-quarter horse-power and three-quarters' horse-power, depending on the conditions of service.

A regular hand rheostat for controlling the motor is included with every pump, and at a slight additional cost we will furnish a special device for automatically stopping and starting the pump without the services of an attendant. With this arrangement, a constant supply of water is maintained in the tank ready for immediate use.

In addition to the pump above described, Worthington pumps suitable for all services are built to be driven by electric motors, and special designs have been made to cover the requirements of hydraulic-elevator service, mine service, water-works supply, irrigation purposes, fire-protection, or, in short, any service where electric motive power can be used to advantage. The success of this kind of apparatus depends, however, so much upon a careful selection, not only of size, but of the type of machine to be used, that full particulars should be sent in asking for an estimate.

HENRY R. WORTHINGTON,
86-8 LIBERTY ST., NEW YORK, N. Y.

ENAMELLED BRICK.

CHICAGO, October 28, 1895.

WE are pleased to give copies of two recent testimonials regarding our Enamelled Brick.

CHICAGO, September 28, 1895.

J. VAN INWAGEN, ESQ.,
President Tiffany Pressed Brick Co.,

Dear Sirs, — We have used a large quantity of the "Tiffany" Enamelled Brick and believe them to be, in quality and finish, fully equal to the best English product. We have found it to be an especial convenience to be able to obtain special shapes without delay.

Very truly yours,
ADLER & SULLIVAN, *Architects.*

CHICAGO, September 26, 1895.

J. VAN INWAGEN, ESQ.,
President Tiffany Pressed Brick Co.,

Dear Sirs, — Having used about 120,000 of the "Tiffany" Enamelled Brick in the construction of the new Guaranty office-building in Buffalo, N. Y., we are pleased to state that they have given the owners as well as ourselves, perfect satisfaction and we believe them to be equal, if not superior, to any Enamelled Brick made in this country or elsewhere.

Prompt delivery was an especial feature.

GUARANTY CONSTRUCTION CO.,
By Geo. M. Moulton, *President.*

We have recently secured the large contract for Enamelled Brick for the new Century Building, St. Louis, Mo.

Yours truly,
TIFFANY PRESSED BRICK CO.

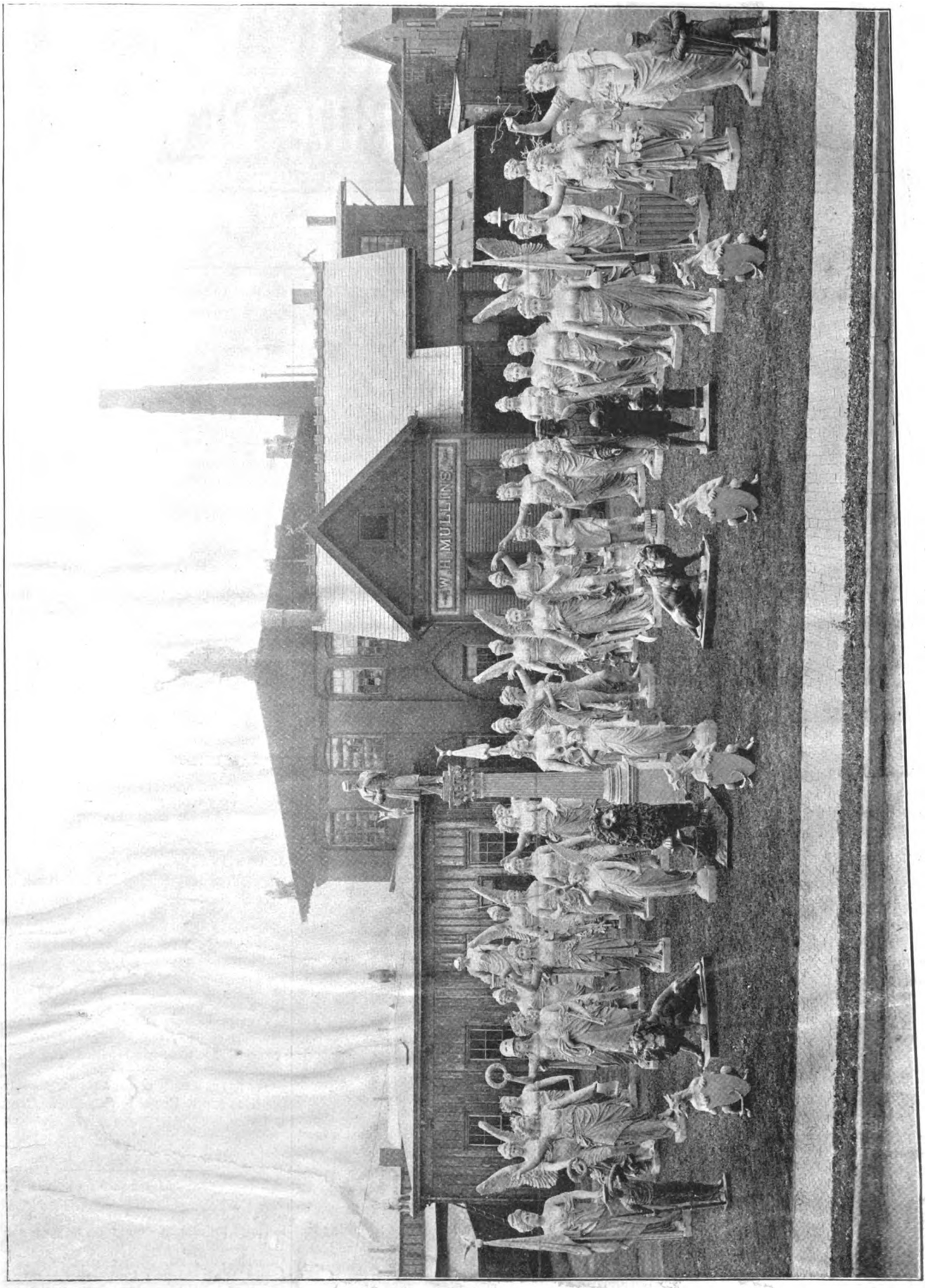
I. P. FRINK, 551 Pearl Street, New York, whose justly celebrated Reflectors are used so extensively, has recently equipped the following prominent buildings: Evangelical Lutheran Church, Cumberland, Md.; Baptist Church, Amherst, N. S.; St. Paul's School, Lagos, West Africa; Lutheran Church, Van Wert, O.; Drill Hall, 23d Regiment Armory, Brooklyn; Evangelical Church, Wilkesbarre, Pa.; Central Presbyterian Church, Akron, O.; Opera House, Portland, Ind.; St. Matthews, Lutheran Church, Hanover, Pa.; Holy Trinity Church, Mc. Sherrystown, Pa.; Baptist Church, Elberton, Ga.; M. E. Church, Quitman, Ga.; Baptist Church, Franklin, O.

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SCULPTURE IN SHEET-METAL.

This group of high-art sheet-metal statuary is shown as it stood outside of my workshop in Salem, Ohio. At the extreme right is seen a soldier, life-size, and at the extreme left is a sailor, also life-size: the originals of these two statues were made for the Soldiers' and Sailors' Memorial Building at Newark, Ohio. The originals of the two sitting lions were made for and placed at either side of the main entrance to the I. O. O. F. Temple at Philadelphia, Pa. The lion rampant in the centre is one of the largest ever made in sheet-metal and is a very beautiful piece of work. To the right of the lions is the Statue of Columbus, which is a duplicate of the one which stood just inside the main entrance to the Cold-storage Building at the World's Fair, Chicago, and which was saved when the building was destroyed by fire and has been erected as a monument to the memory of the brave firemen who lost their lives in this disaster. Surmounting the column in the centre of the group is a statue of a soldier at "parade rest," which is a very fine piece of work. Among the remaining statues can be recognized, Electricity, **Sculpture**, Painting, Agriculture, the Seasons, **Music**, Law, Liberty and many others, while on top of the building is Germania with wreath in hand, crowning them all.

(*Continued on page 4.*)



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BINDERY INC.
MAY 99

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